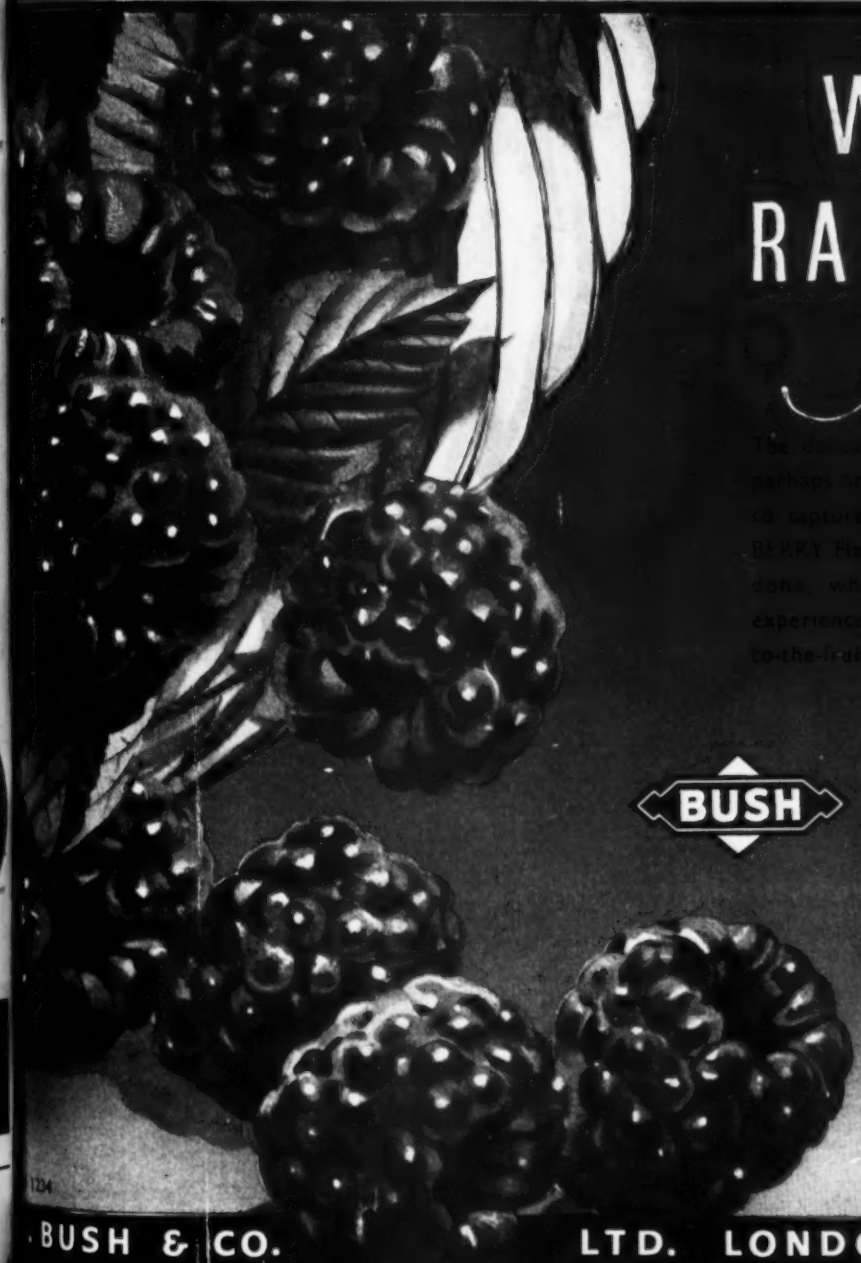
FOOD MANUFACTURE

Incorporating Food Industries Weekly

A PUBLICATION OF THE LEONARD HILL TECHNICAL GROUP NOVEMBER 1, 1956



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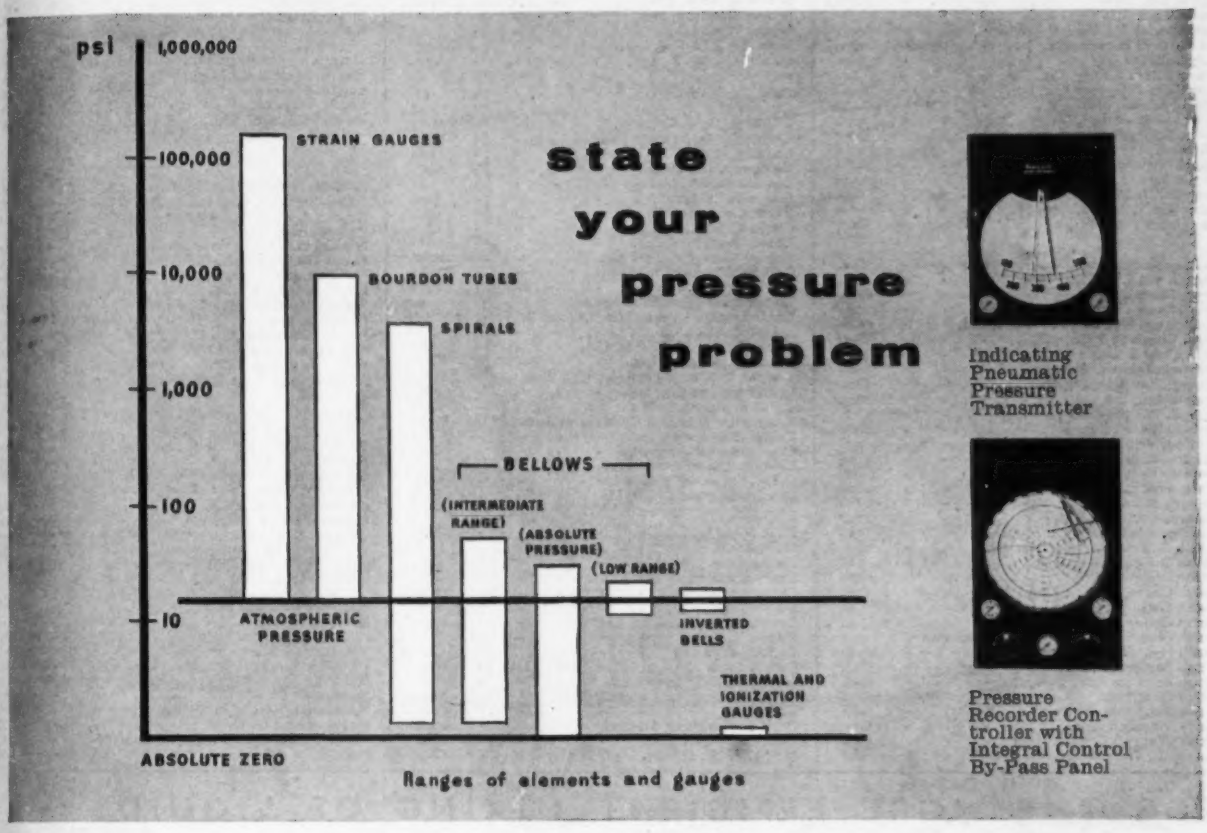

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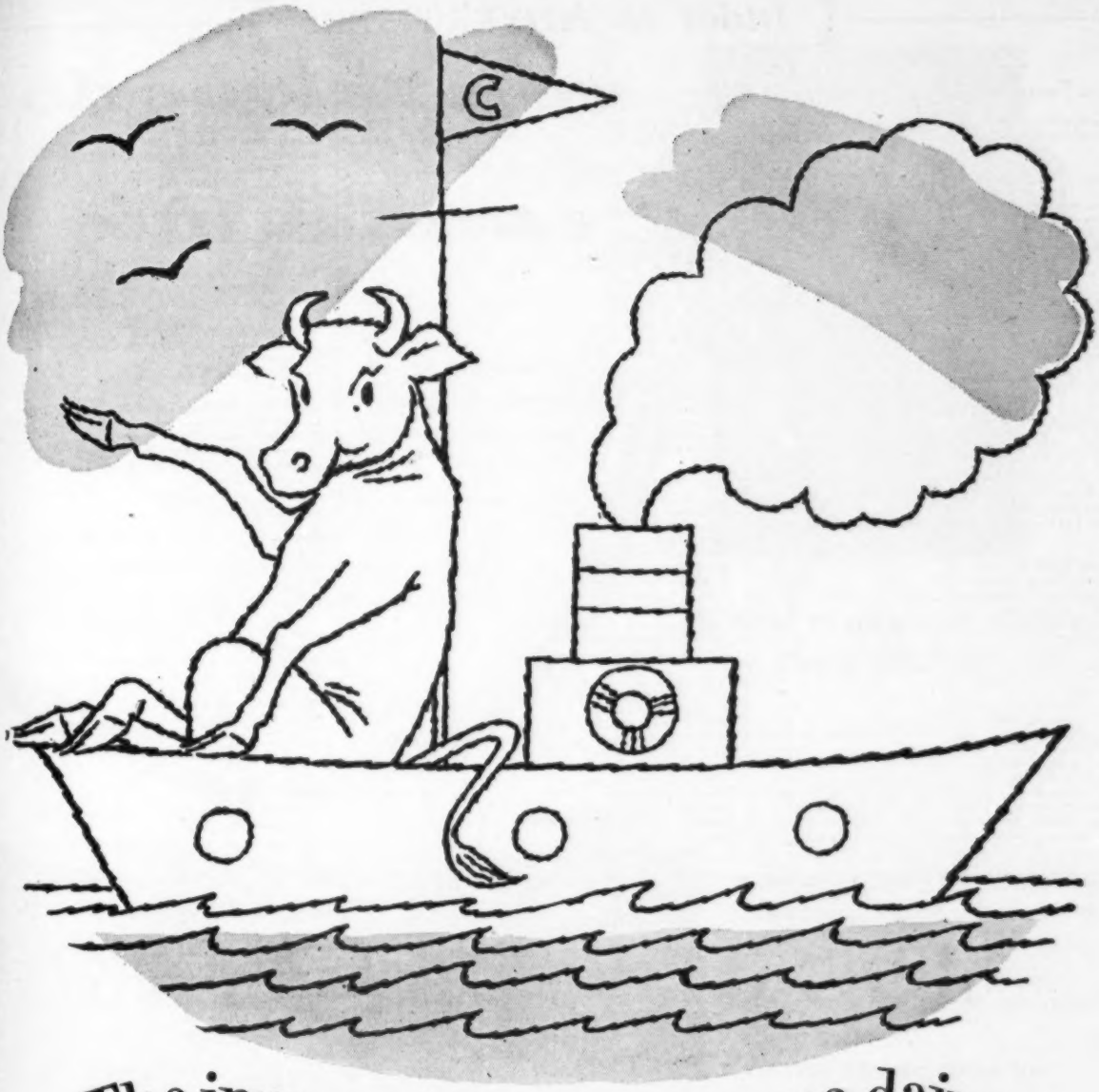

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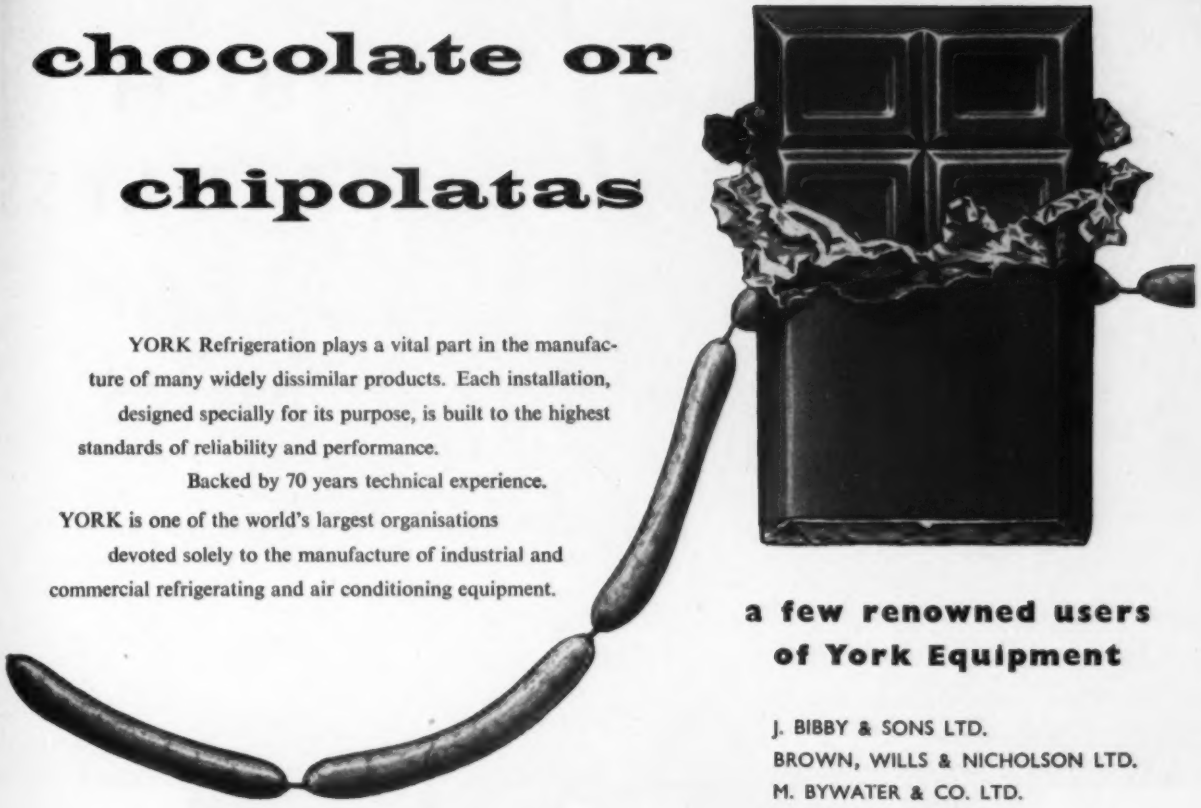

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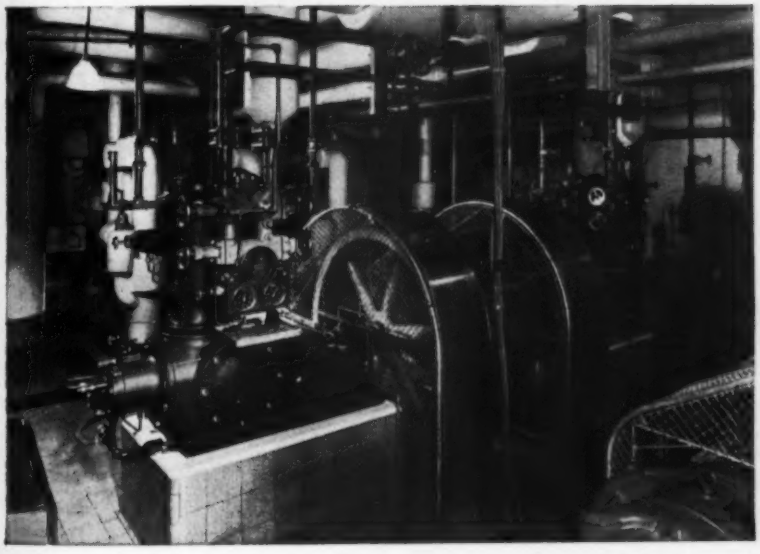

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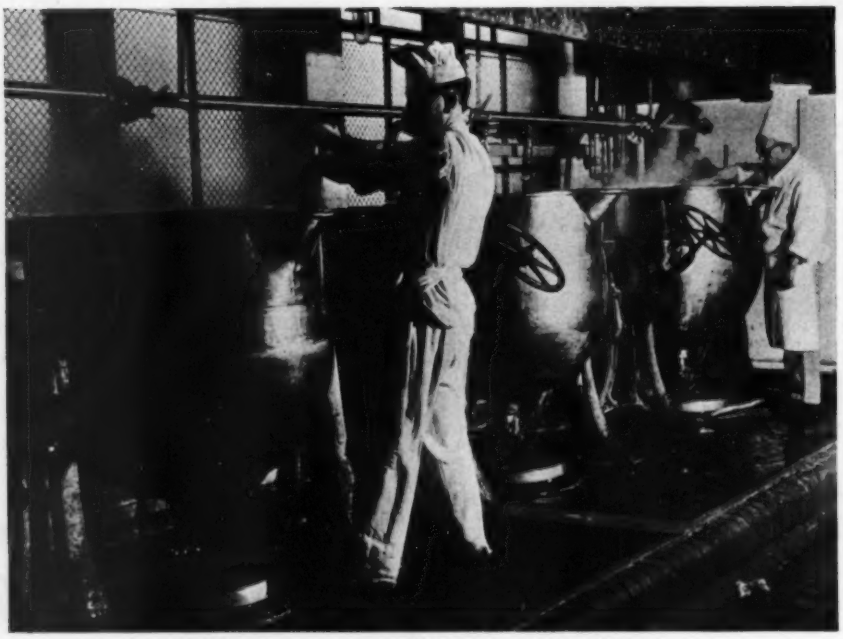

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(with acknowledgements to Messrs Food Trade Review for loan of block)

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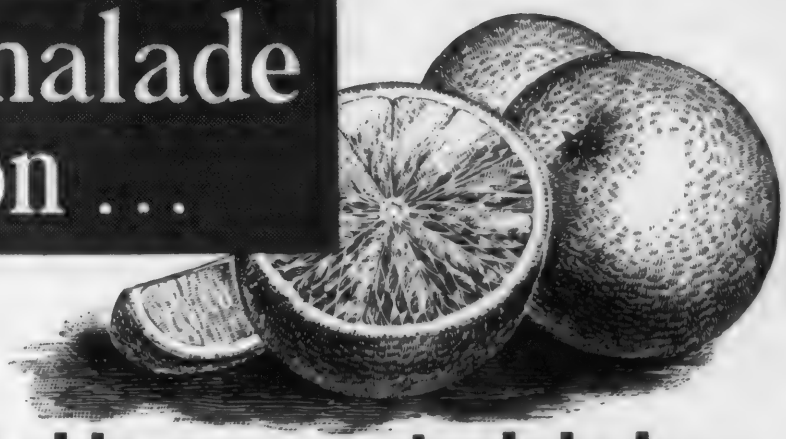

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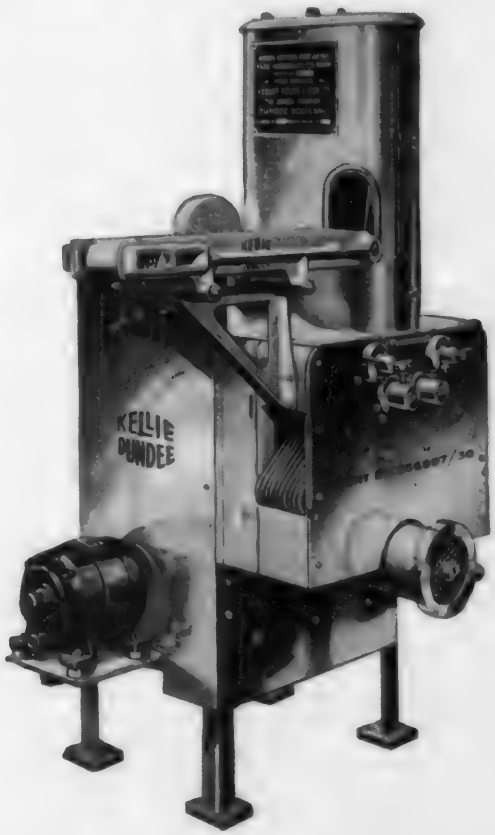

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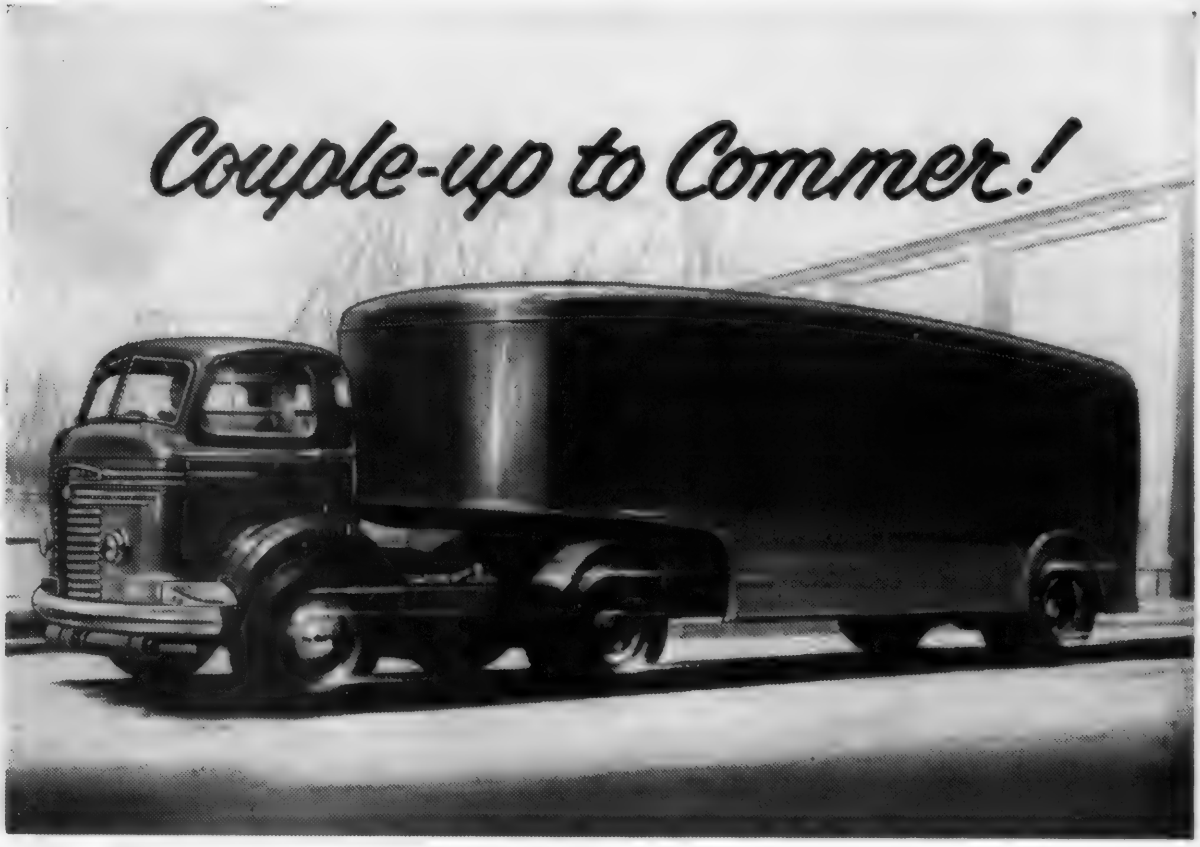

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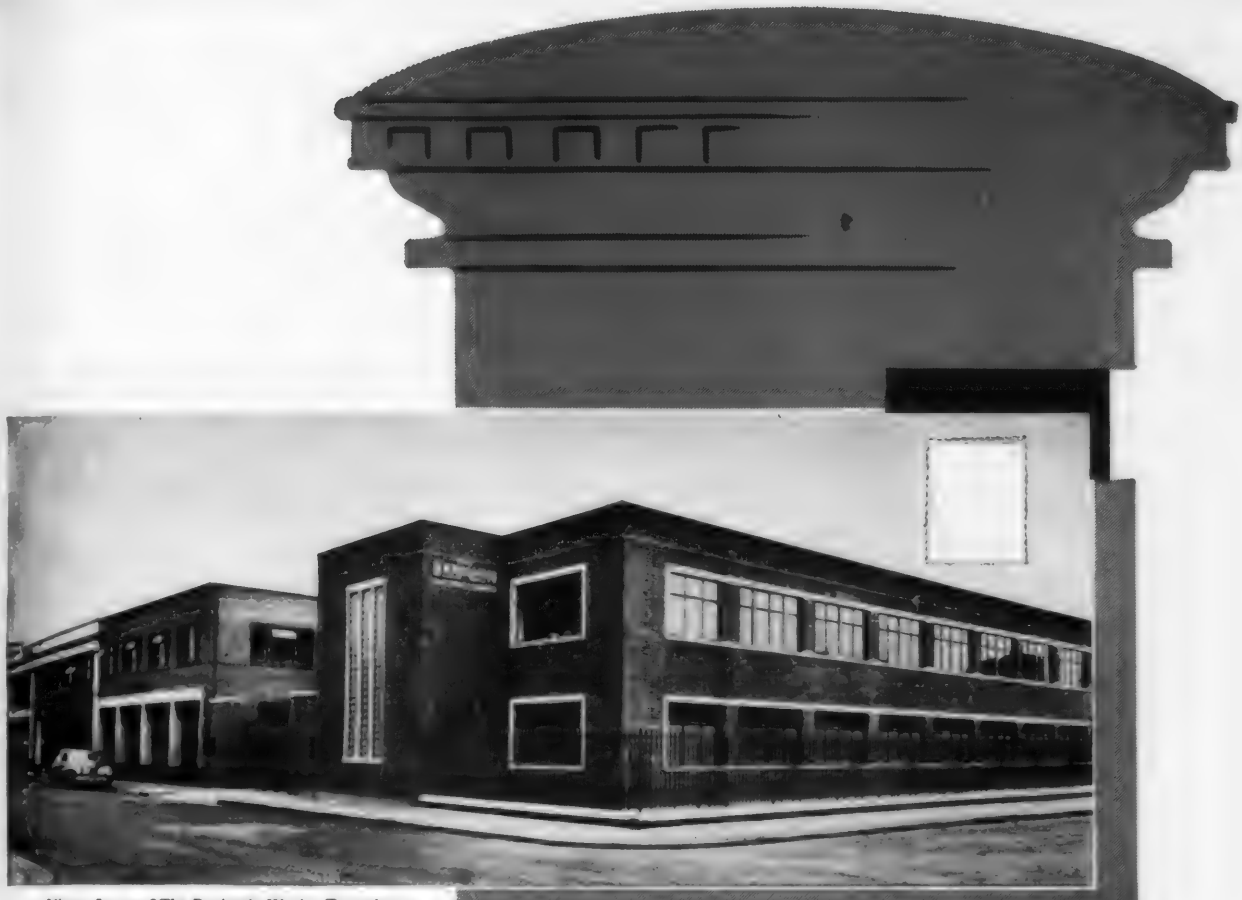

View of part of The Benjamin Works, Tottenham.

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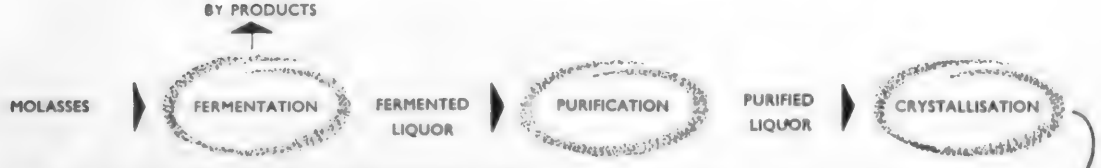
Smee's 56

FINE CITRIC ACID IN THE MAKING

Running a Temperature

No use telling our new artist that pictures are a primitive form of expression which gave way to symbols, alphabets and written language. Just mention a phrase and he makes a visual interpretation of it — usually the wrong one. The high temperature we had in mind gives no cause for alarm, but it is in fact essential at a certain stage in the production of Sturge citric acid. It occurs when spores of Aspergillus Niger are sown in molasses.

As the spores feed on the raw material and form a mould, considerable heat is generated. After several days, when the conversion to acid is complete, the solution undergoes several stages of refining before emerging as the pure citric acid for which Sturge is famous throughout the world.



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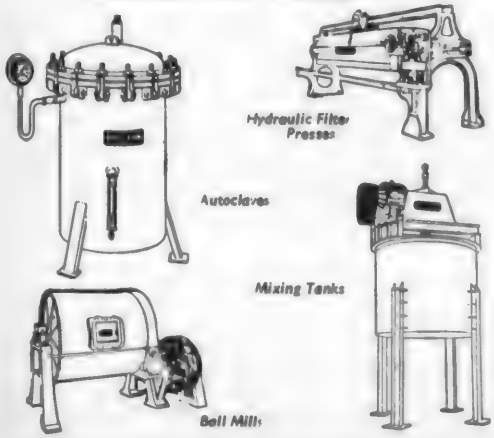
- ★ **Made in 4 sizes**
- ★ **Other process equipment manufactured by William Boultons Ltd. includes:—**



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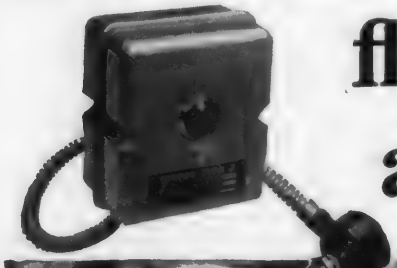
W.B.11

TEKTOR
ELECTRONIC LEVEL CONTROL

watches levels on flour storage bins at Lyons, Cadby Hall



The Fielden TEKTOR is a simple and reliable warning and control device for the level control of liquids or solids. The probe is inserted into the container at the required position and a warning light appears immediately the contents of the container reach that level. Sensitivity is easily adjustable and is so precise that the TEKTOR will work either when the contents touch the probe or merely by their proximity. The relay can be connected to any circuit to operate an external alarm or to control the equipment feeding or discharging the container. Simple to fit, the TEKTOR will work indefinitely without attention.

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H.S. 276

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* ***See page 74 of "Laboratory Practice" Feb. 1956.***

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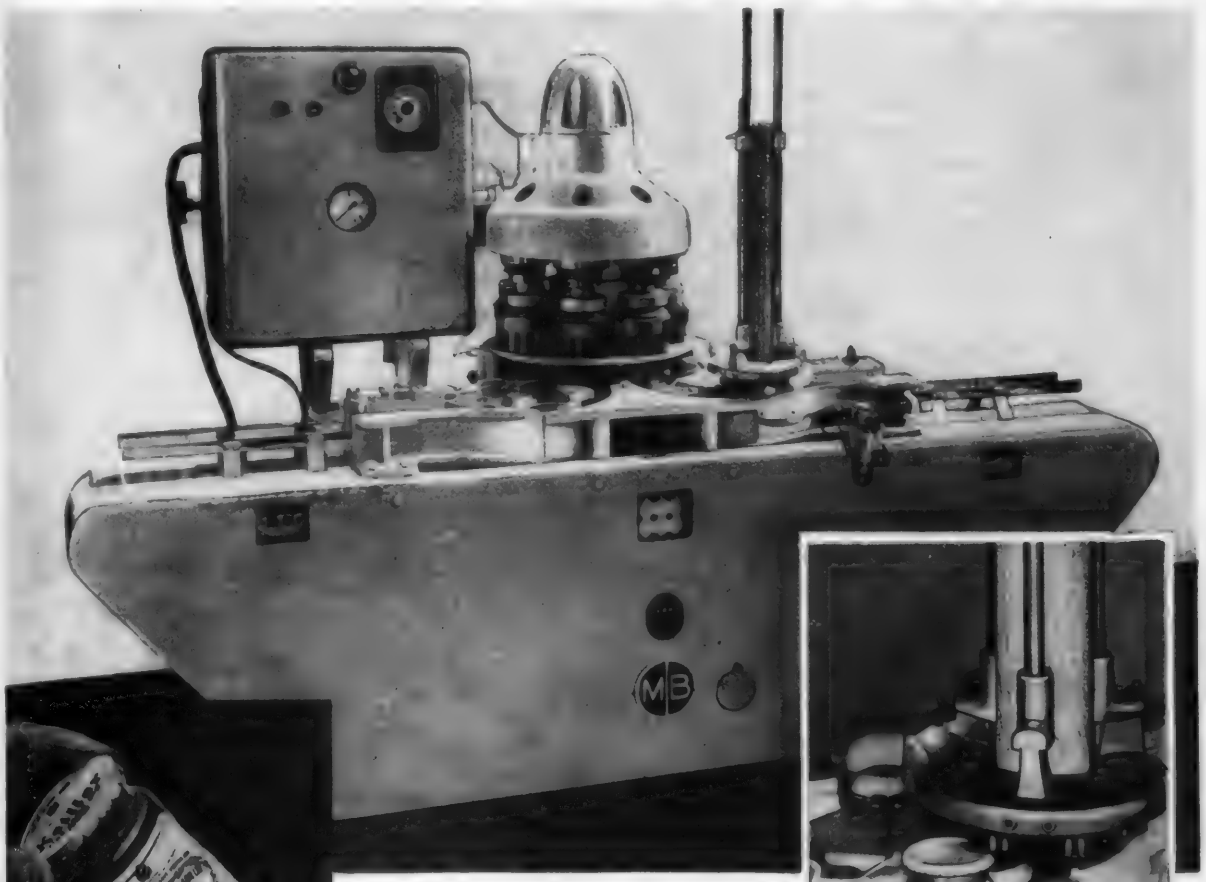

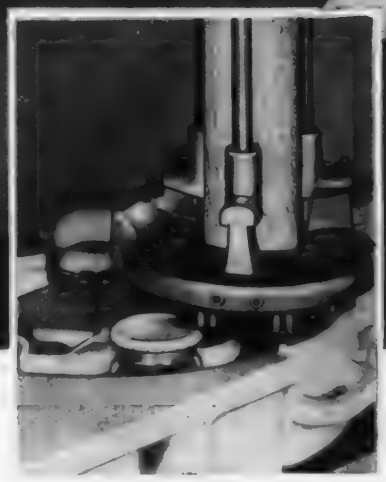

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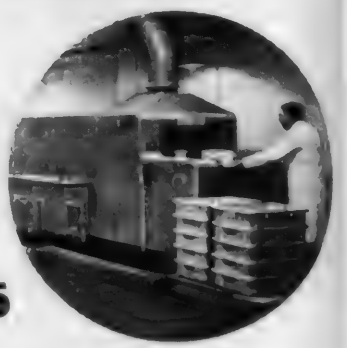
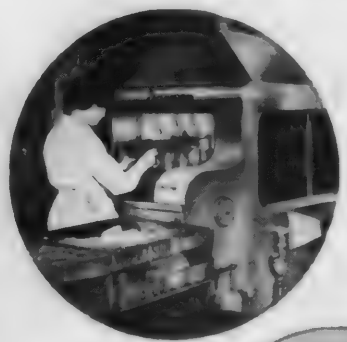
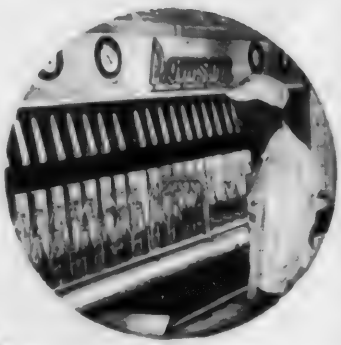


BAKERS TRAYS



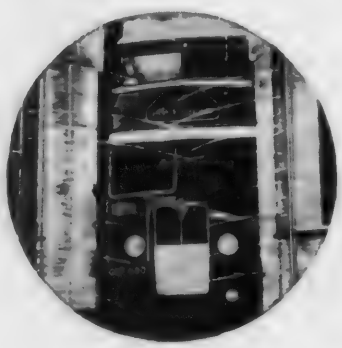
ALL JARS



ALL BOTTLES

DISHES

FISH BOXES



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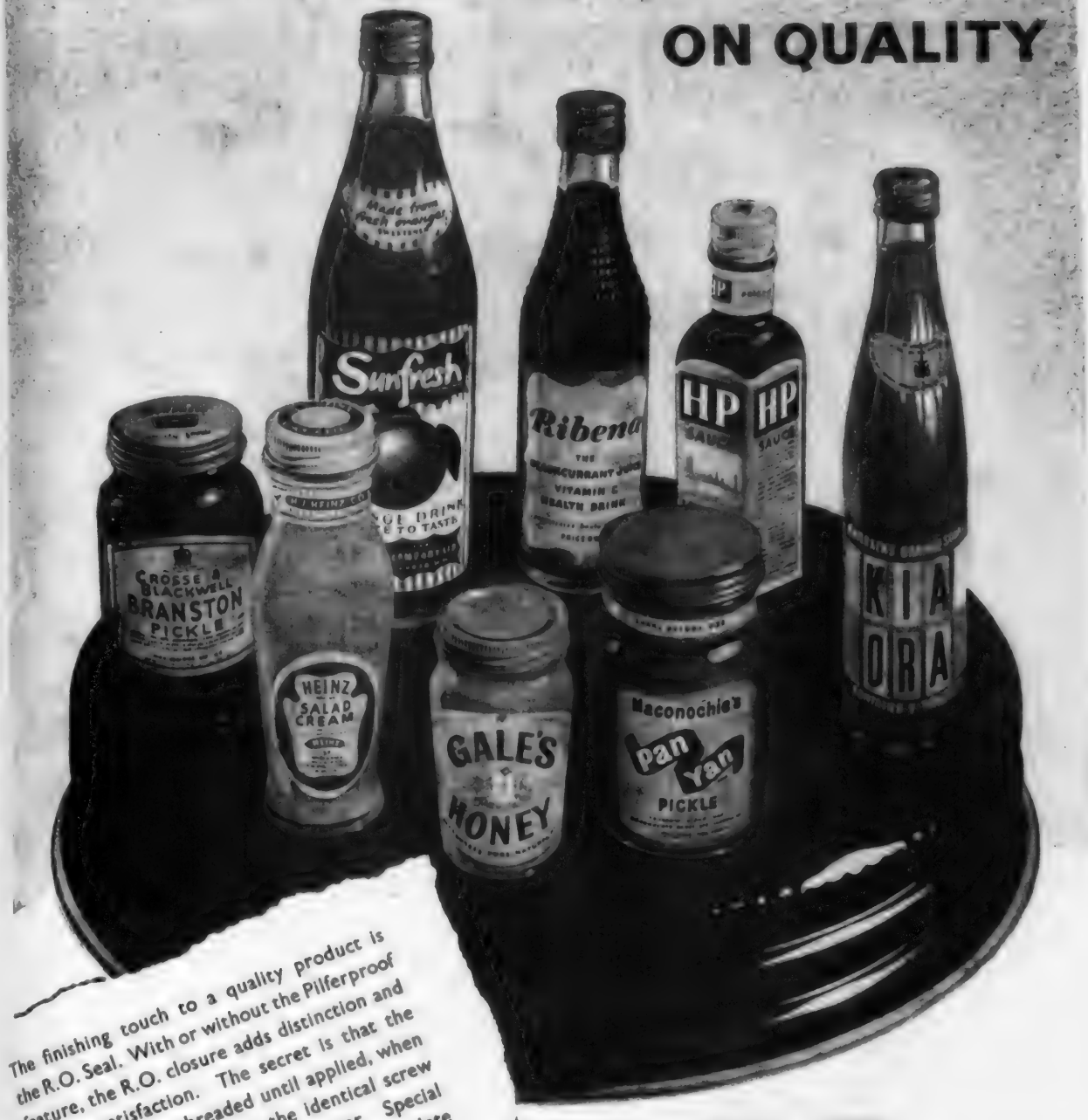

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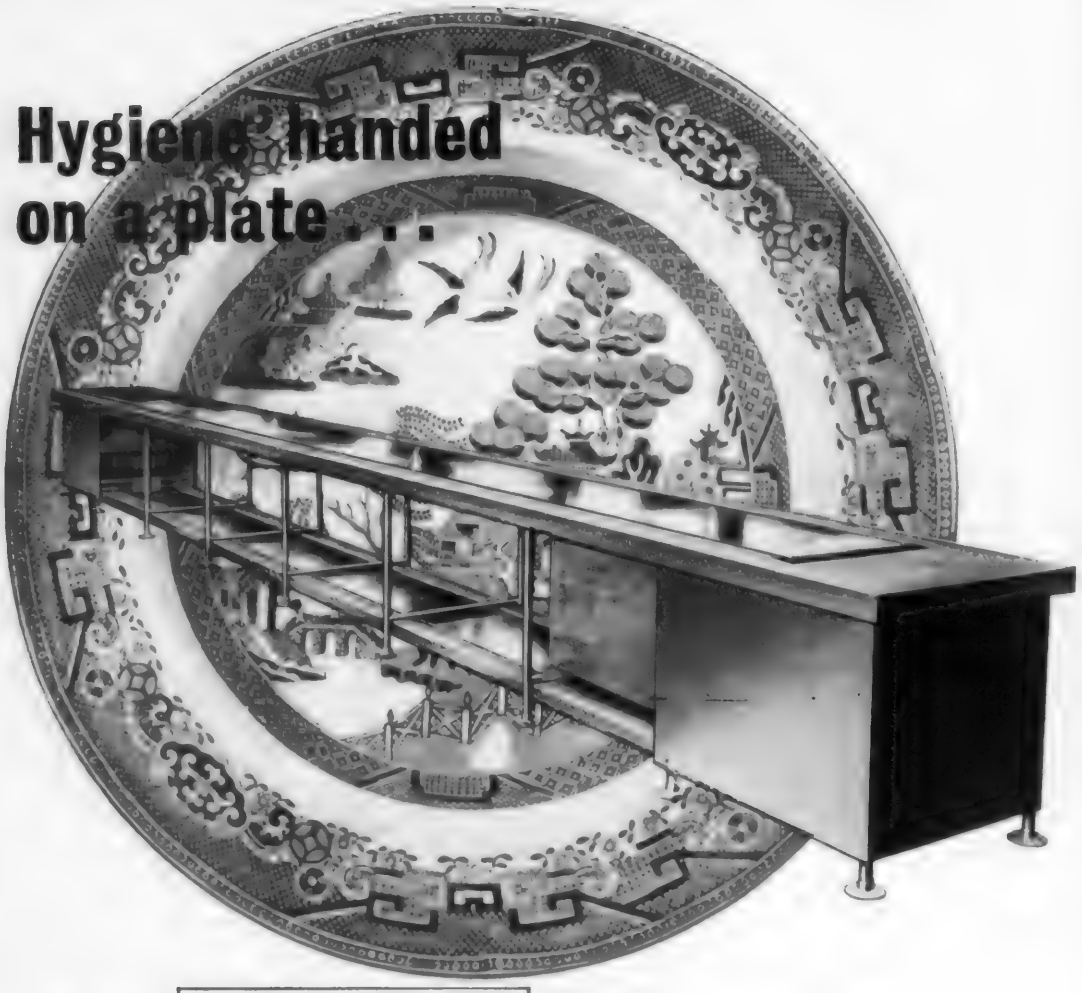

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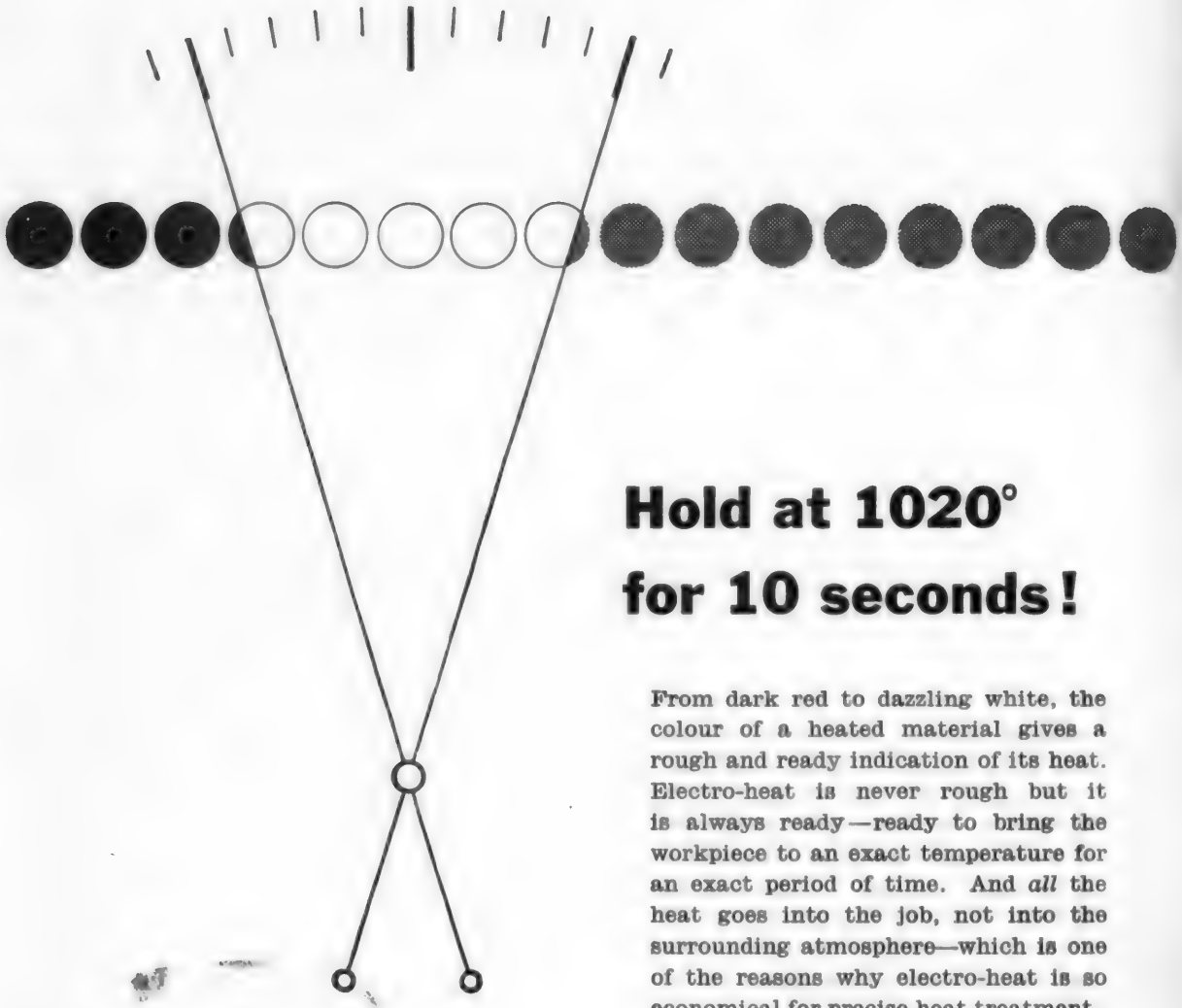

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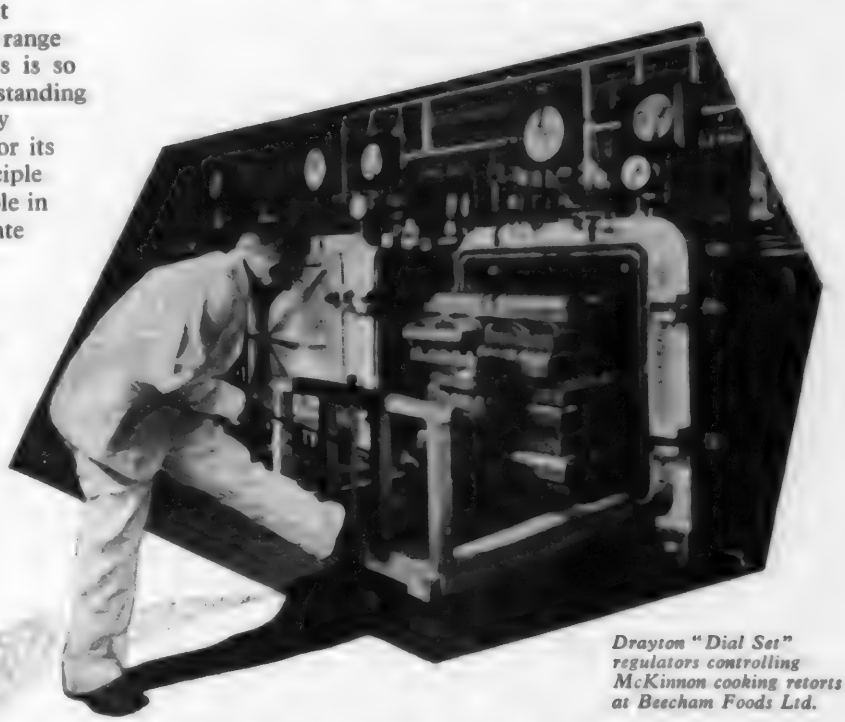

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Good News!

NEW ZEALAND increases its production of DRIED MILK POWDERS

More New Zealand Spray Skim Milk Powder will shortly be available on the United Kingdom market.

Several

NEW FACTORIES

commenced production of both

ANCHOR and FERNLEAF

Milk Powders on August 1st, 1956

The world demand for these two excellent powders is rapidly increasing, and this additional production will help to meet it.

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Sole Distributors for
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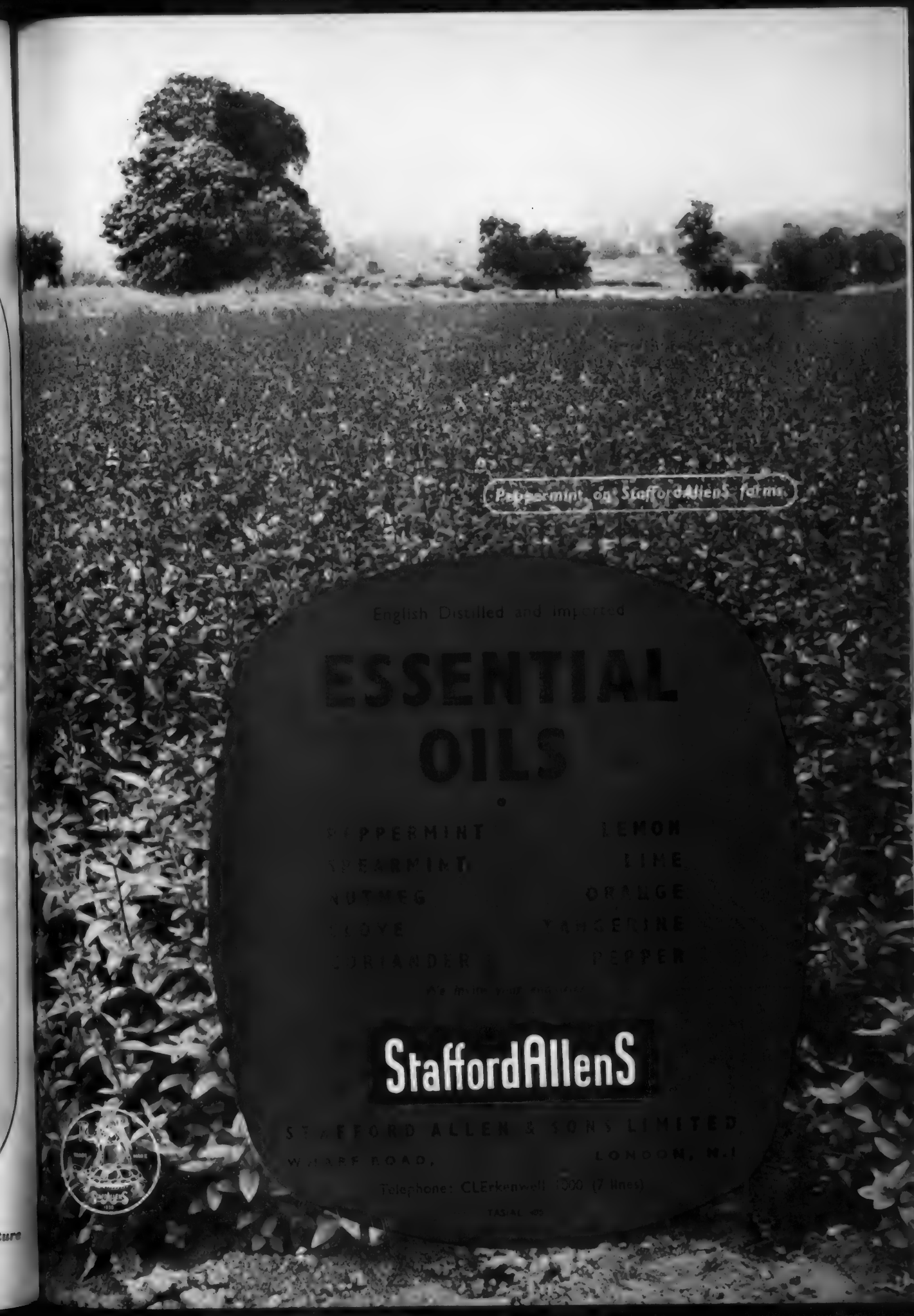
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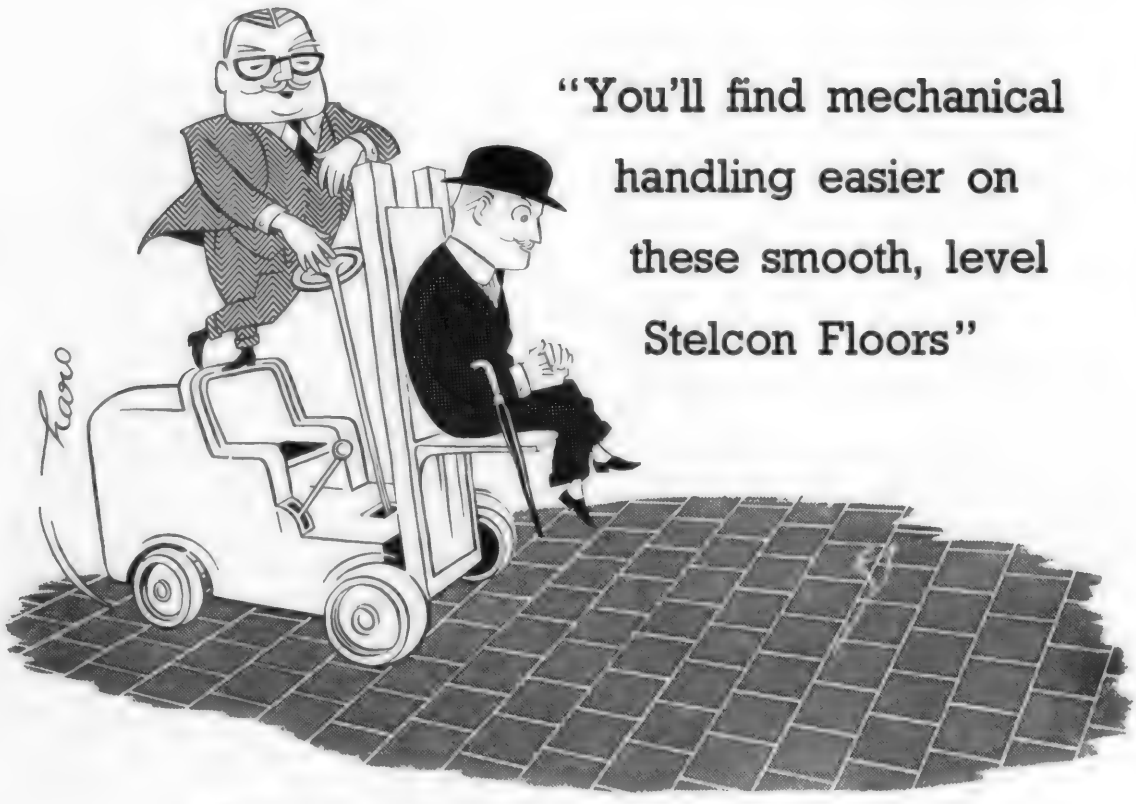

"You'll find mechanical handling easier on these smooth, level Stelcon Floors"

Modern mechanical handling works best when floors are smooth and even. You can carry maximum loads without mishap. That's why more and more industrial concerns are installing Stelcon Floors — they like things to run smoothly all the time.

Stelcon Anchor Steel Plates and Steel Clad Flags also provide dustless, hygienic floors of great strength and durability. Full details sent on request.

You'll find

Stelcon

FLOORS

in every industry — everywhere

To satisfy the requirements for a non-dusting, level surface, Stelcon Anchor Steel Plates were chosen for the floor of their new Strip Mill by Messrs. Firth Vickers Stainless Steels Ltd., Sheffield.

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IT'S THE Lacquer THAT COUNTS

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Braby Aluminium Alloy trays are supplied with or without ventilating louvres or with slotted bottoms for draining. Pressed lids and perforated false bottoms are available if required without interfering with the stacking facilities.

Supplied in two sizes:—

20" x 15" x 6" deep, capacity 1660 cu. in.
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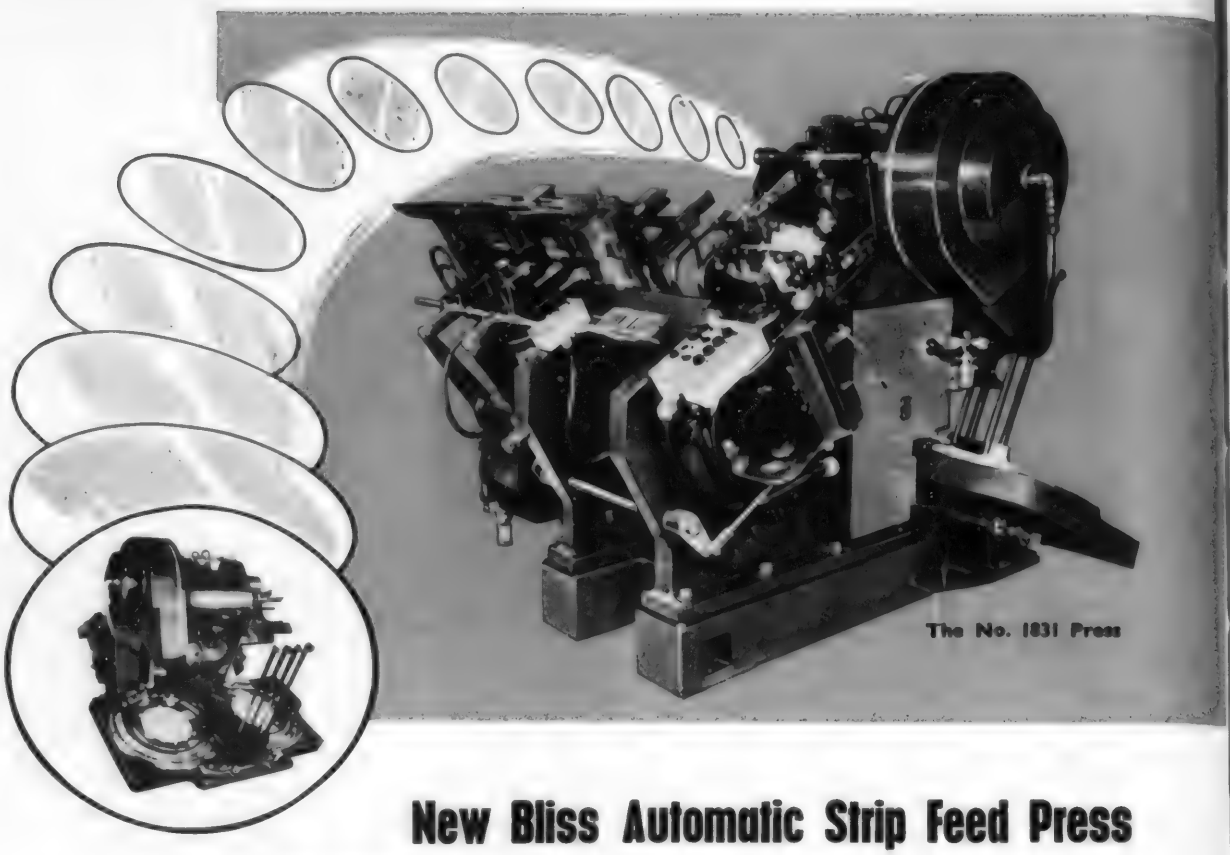

New Bliss Automatic Strip Feed Press will deliver more than 300 strokes per minute!

From the ground up, it's been engineered to slash maintenance needs and boost production speeds.

You wanted speed in your strip feed presses—reliable speed! And here it is: to 300 strokes per minute (or more, depending upon can size), more than 18,000 strokes per hour all day long—without time-wasting stoppages for readjustment and repair.

One of the major features of the new Bliss press is its precision counter-balanced crankshaft and feed bar crank which holds vibration to an almost irreducible minimum and thereby permits smooth, quiet operation at high speed.

Other features: combination disc friction clutch and brake—permits instant starting; feed bar is driven by crank instead of lever—and has adjustable fingers; a bigger bolster plate; no idle strokes between strips, if desired; slide stops instantly at top of stroke.

You'll want to know more about these developments. For complete details, write, wire or phone

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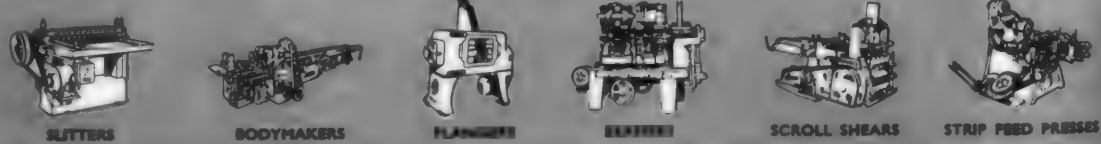
BLISS CAN AND CONTAINER MAKING MACHINERY



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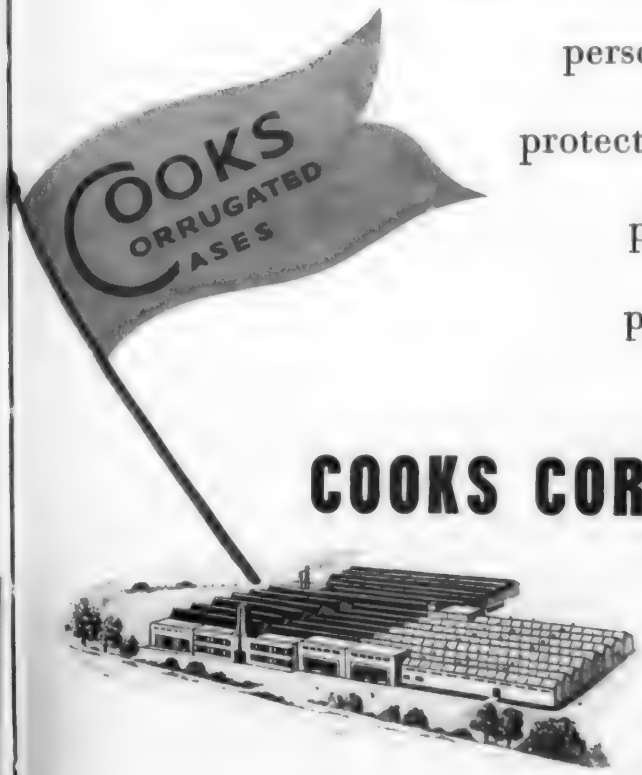
a buyer of **corrugated fibreboard cases** and fitments you will rightly demand the best at a competitive price.

That's where Cooks can help you . . . an independent manufacturing company, backed by a wealth of experience and a completely up-to-date re-equipped factory . . . we offer a new personal service to industry—protection **plus** for **your** product. Bring your packaging problems to



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Life at work, and one's hours of gaiety and leisure. "Insulight" Hollow Glass Blocks let in light like a window — but a softer, diffused light. Yet they preserve privacy like a wall. They blur the objects that can be seen through ordinary glass. They reduce noise almost to quietness. And, like a wall, they keep rooms insulated and warm.

'INSULIGHT' HOLLOW GLASS BLOCKS

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FOR FURTHER INFORMATION ON THE USE OF GLASS IN BUILDING, CONSULT THE TECHNICAL SALES AND SERVICE DEPT., ST. HELENS, LANCS. (ST. HELENS 4001), OR SELWYN HOUSE, CLEVELAND ROW, ST. JAMES'S, LONDON, S.W.1. (WHITEHALL 5672-6). SUPPLIES ARE AVAILABLE THROUGH THE USUAL TRADE CHANNELS.

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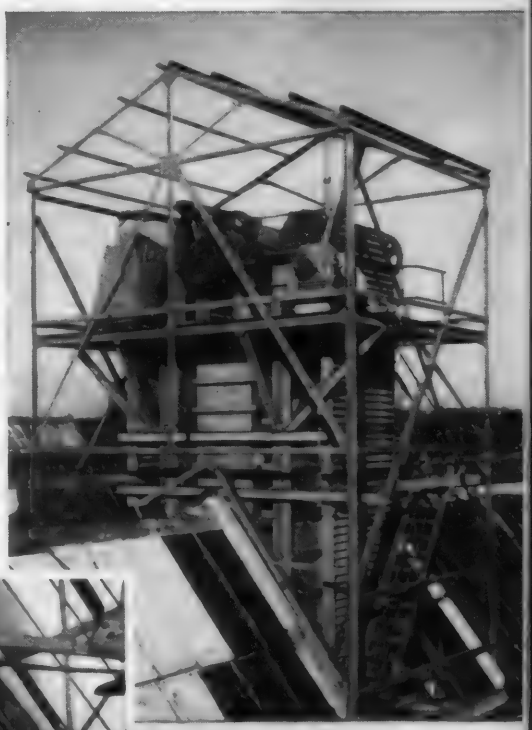

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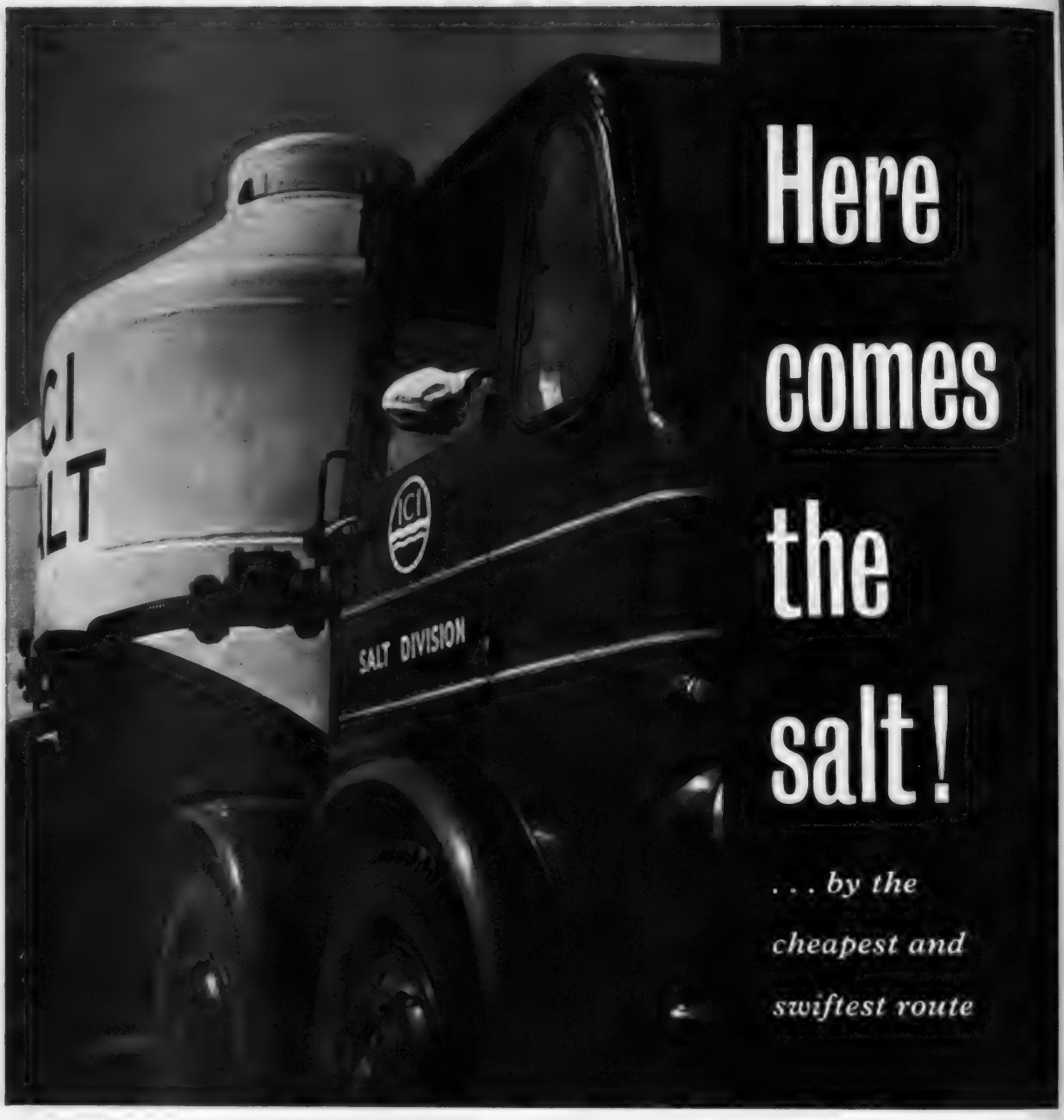

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Write for our booklet giving further details of this new streamlined service to:

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B.S. 40

Firmness

—the mark of a good meat pie

The role of shortenings. Good meat pies should have crusts with rich eating qualities and the necessary firmness to withstand handling without bulging out of shape. To a great extent this depends on using the right shortening. Covo and Silkit are pure white shortenings with the correct consistency for machine production methods.

These high-grade CBC shortenings produce good handling paste — no excessive grease or oiliness — which results in a firm pie crust that retains its shape without sagging or distortion. The use of these quality shortenings imparts short-eating qualities and means that the crust will be firm and dry.

The full CBC range. At CBC we make margarines, shortenings and speciality fats to meet all requirements. Our experience goes back a long way — through the years we have dealt successfully with a wide range of problems. Should you require any information concerning fats, do not hesitate to get in touch with us. Our Sales Director is at your disposal. Write or 'phone; he will be glad to hear from you at any time.

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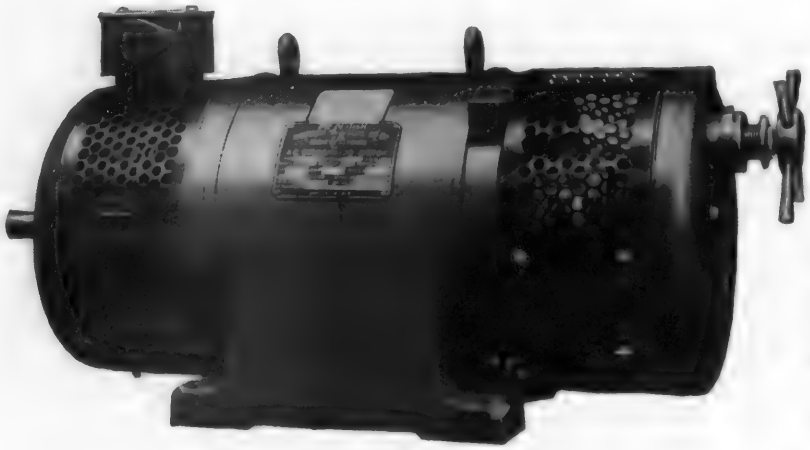

BTH factories are exceptionally well equipped to make both ***STANDARD*** *and* ***SPECIAL*** *machines in large quantities.*

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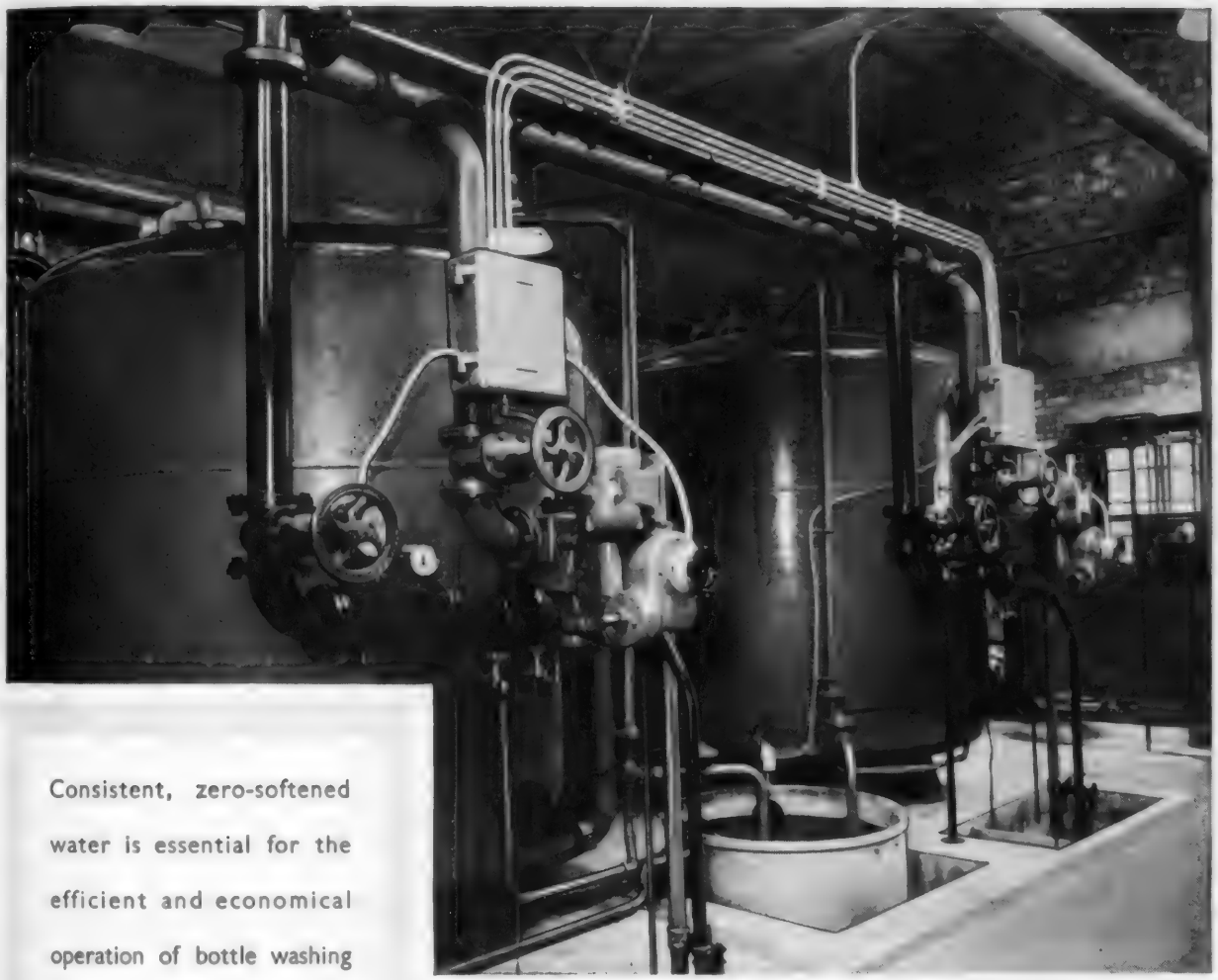

Consistent, zero-softened water is essential for the efficient and economical operation of bottle washing machinery and for the maintenance of the highest standards of bottle cleanliness. These are among the many reasons why Permutit Water Softening Plant is installed at this most modern dairy.

...at the South Morden Bottling Plant of EXPRESS DAIRY

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The first completely rinsable 'Quat' in the world, yet still retaining the fullest sterilising qualities.

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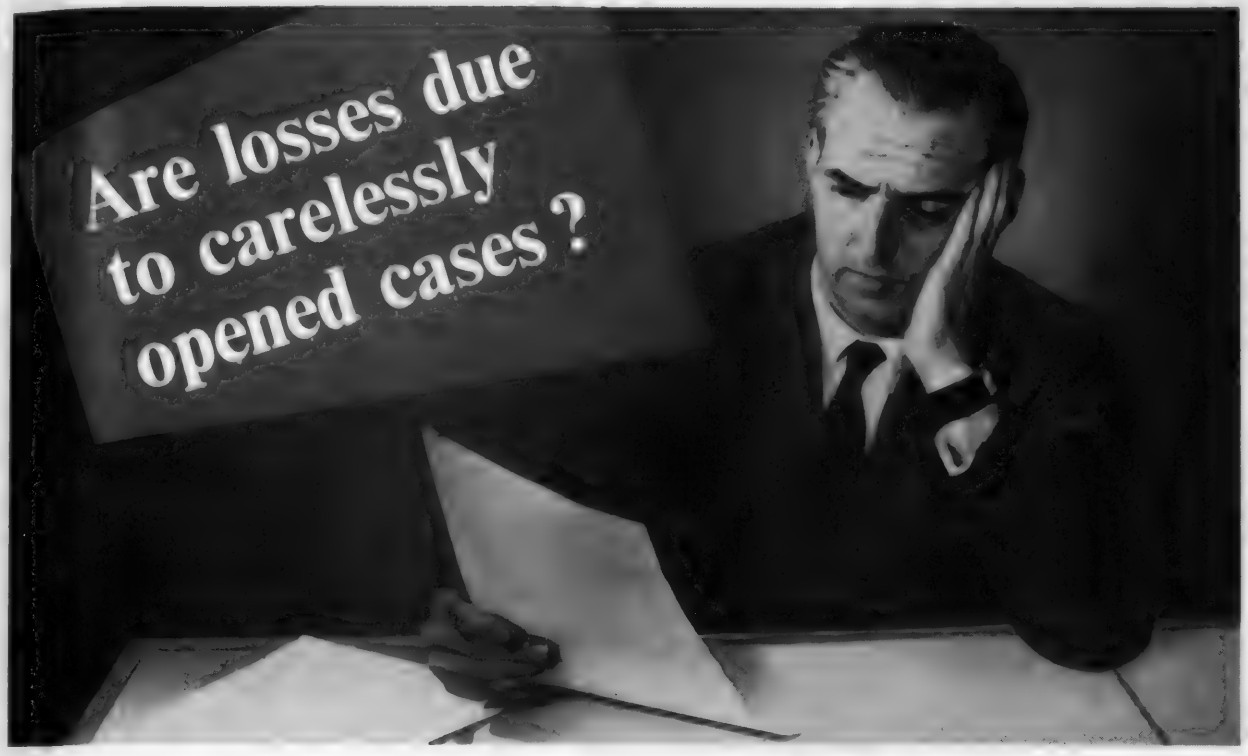

Put away that Knife!

and use *Rippatape* TEAR-STRIP CASES

A new opening method for taped, glued or stitched-joint corrugated or fibreboard cases eliminating costly knife damage.

Rippatape is easily and inexpensively applied by the manufacturer to the inside of the container blank. The tear-strip action operates from a slot situated a short distance from the edge of the container blank. When the tab is lifted and a continuing pull exerted, 'Rippatape' cleanly severs its way through the wall of the case along a line determined by the placement of the tape.

Consider the many advantages of using Rippatape Tear-Strip Cases:

- REDUCES HANDLING AND LABOUR COSTS
- SPEEDS UP RE-STOCKING OF COUNTERS
- EASY AND SAFE TO OPEN
- EASY REMOVAL OF GOODS
- AVOIDS REPLACEMENT CLAIMS
- HANDY RE-USE OF CASES
- RETAINS THE FULL STACK STRENGTH OF THE CASES

Photographs by kind permission of Empire Dairies Ltd.

Illustrating the ease of opening Rippatape Tear-Strip containers produced for Empire Dairies Ltd. These new containers have been specifically designed to assist the trade to facilitate the easy breakdown of pats of butter into two separate units.

The trend is to ease and speed packaging . . . so take advantage of the *many* advantages offered by this modern Rippatape Tear-Strip opening method.

•

Contact your case manufacturer without delay for further information.

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- " Viskrings " can be applied rapidly by hand—no machinery is necessary.
- They are self-adjusting.
- They prevent the blowing or riding of stoppers.
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- They afford protection for branded products and reduce pilferage and evaporation.
- CELLULOSE CLOSURES . . . Contain No Metal . . . Require No Adhesive.

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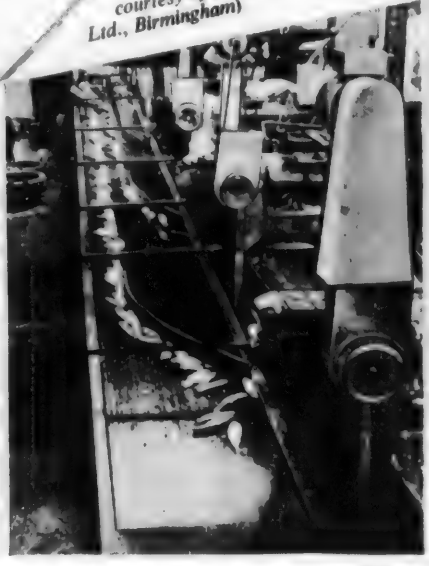
helps the food industry

REMEMBER POPPY DAY

Cake packing on a 'Motaveyor' (by courtesy of Knightsbridge Cake Limited, Manchester)

Fruit bottling on a 'Motaveyor' conveyor (by courtesy of J. Mawdsley Ltd., Wigan)



Scandura conveyor in a fish canning factory (by courtesy of Fisher & Ludlow Ltd., Birmingham)

As the pioneers of P.V.C. covered conveyor belting British Belting & Asbestos have supplied their SCANDURA belting for many varied applications. Due to its resistance to contamination and its hygienic qualities SCANDURA has become the obvious choice for food conveyor belting. Its lasting qualities had already been proved in food factories two years before its first introduction in Britain's coal mines in 1948, and its fire resistant properties have brought a hitherto unknown safety margin where conveyor fire hazards originally existed. SCANDURA is available now, in varying widths and thicknesses to suit all applications.

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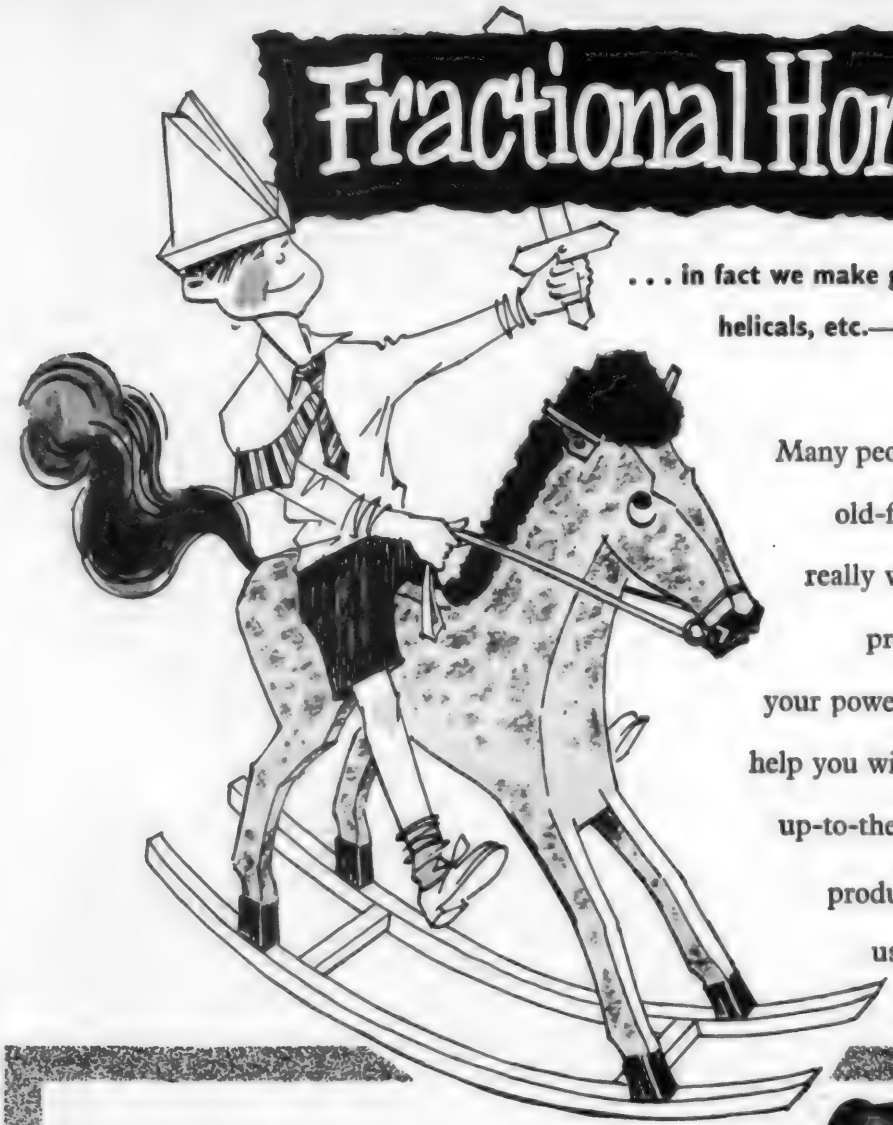

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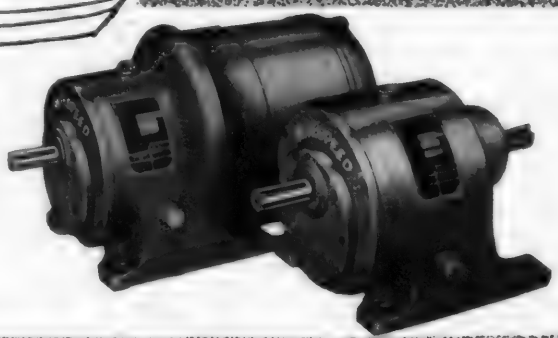

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- OUTPUT SPEED RANGES :—
  $^1/_3$ to 3 x input
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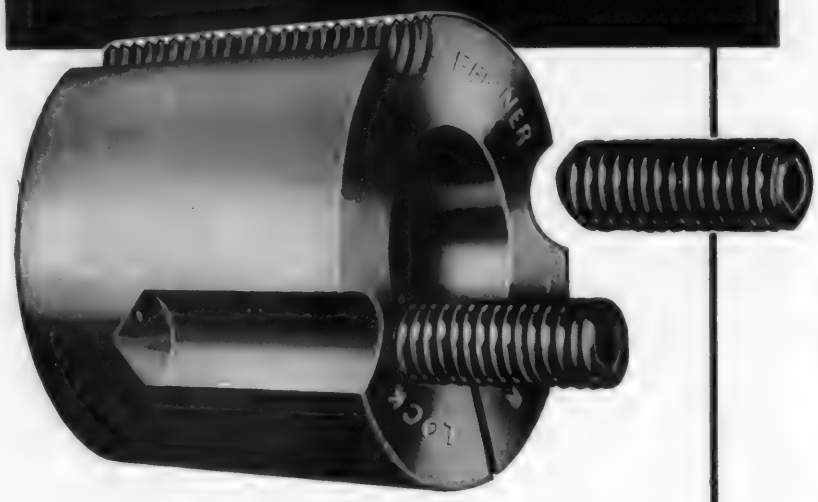

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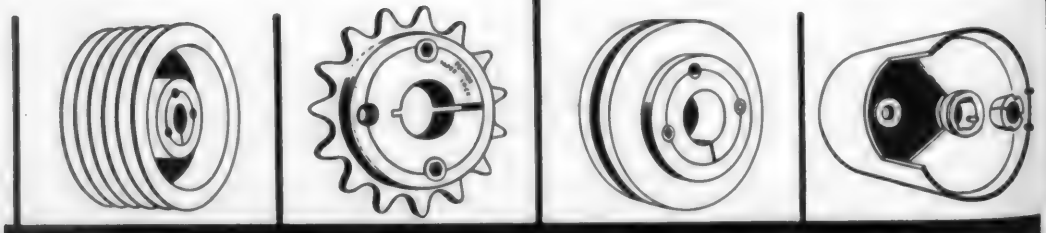

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Install me in your factory and you'll find me one of the liveliest workers on the payroll. And if you sell powered machines put me in them also. Your customers will like to see my good name added to yours. *They* know a good fractional too !

G.E.C. Fractionals give you the advantage of famed G.E.C. reliability at no extra cost. They are available in all standard ratings and with a full range of mountings.

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Laboratory control of every batch ensures constant standard.
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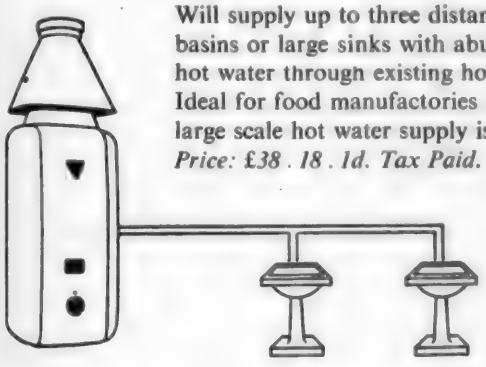
The Ascot hot water system makes it easy and economical for everyone in the food and catering trades to comply completely with the new, stringent Food Hygiene Regulations specifying a controlled hot water supply. An Ascot gas water heater gives you an instant, endless flow of really hot water at low cost—hot water that's on tap from the moment you open your premises right up to when you shut up shop. Ascots are easily and cheaply installed, and the wide range available includes models to meet every need of every food trader.

Whatever your hot water problem under the new legislation, Ascot can solve it. Full information from any gas showroom or from Ascot's own Advisory Service

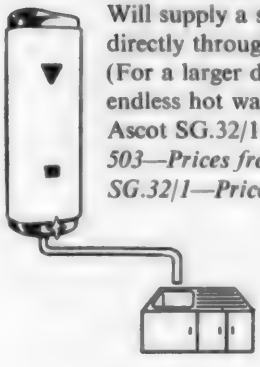
ASCOT

ASCOT 709 LARGE MULTIPOINT



Will supply up to three distant handbasins or large sinks with abundant hot water through existing hot taps. Ideal for food manufactories where a large scale hot water supply is essential.
Price: £38 . 18 . 1d. Tax Paid.

ASCOT 503 SINK WATER HEATER



Will supply a sink or handbasin directly through a swivel spout. (For a larger direct supply of instant endless hot water to a big sink, the Ascot SG.32/1 is ideal.)
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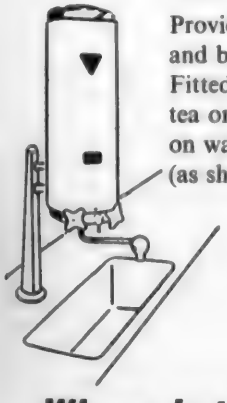
SG.32/1—Price: £33 . 15 . 4d. Tax Paid.

ASCOT 509 BOILING WATER HEATER



Provides warm or hot water instantly and boiling water in less than a minute. Fitted with 3-heat control. Ideal for tea or coffee making. Can be installed on walls, or on shop or bar counters (as shown) on an Ascot pillar support.
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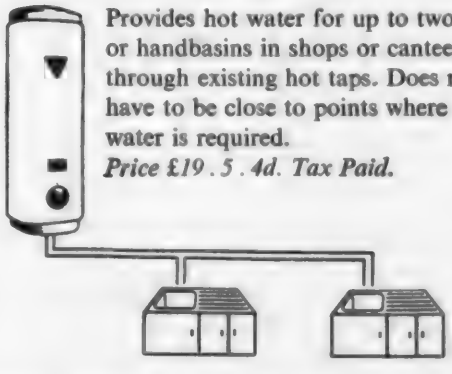

Provides hot water for up to two sinks or handbasins in shops or canteens through existing hot taps. Does not have to be close to points where water is required.
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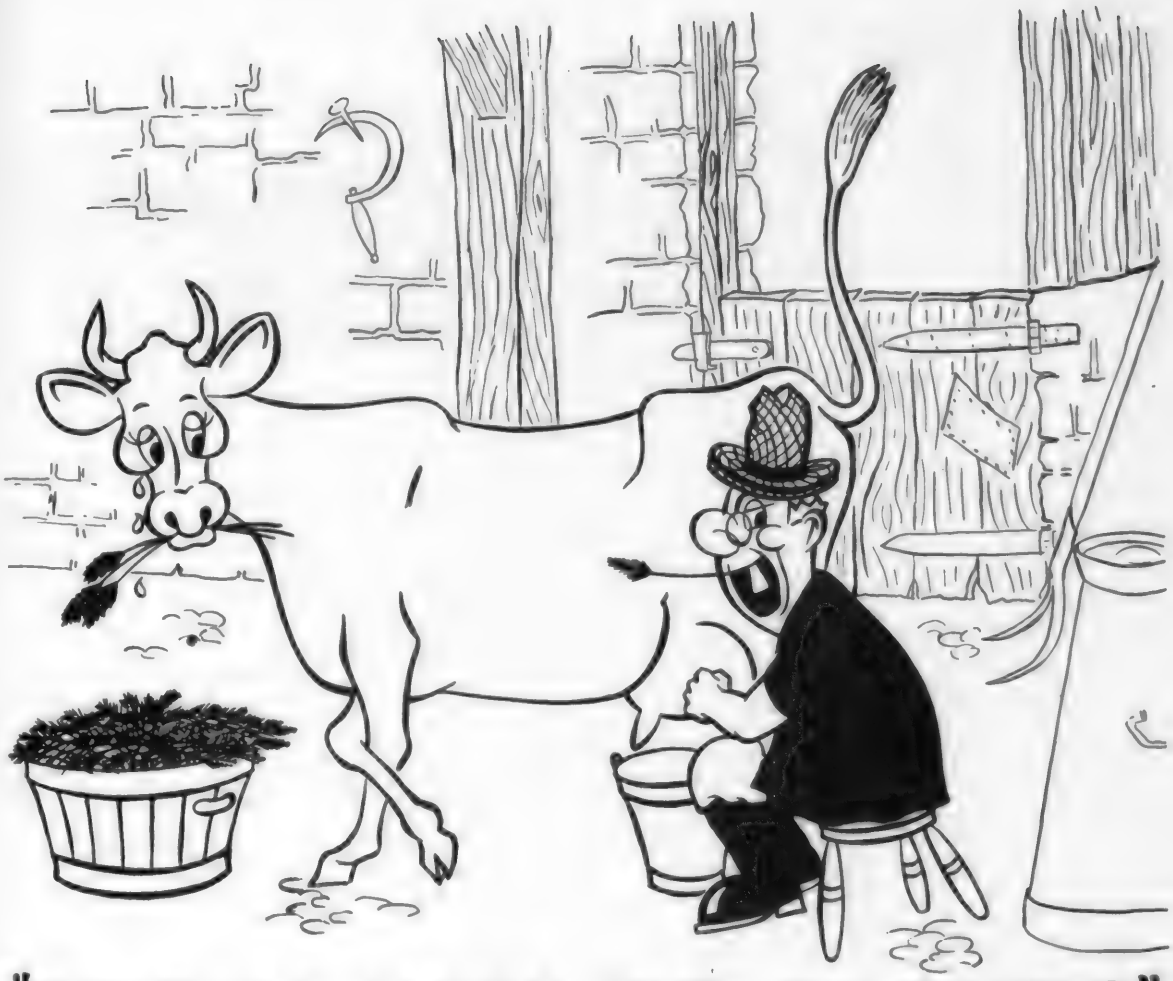

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"It's true Pop, ask 'Daisy Bell.' Look, she's bored to tears. And the time it takes. How your back must ache! Not too hygienic either, you can't put 'Untouched by human hand' on your milk bottles. Tell you what Pop, drop us a line, we'll tell you how to mechanise with one of our motors on a modern milking machine. Just imagine—the time you spend milking can be well used elsewhere! 'Daisy' will be more contented too, she may even look forward to milking time."

Out of date means out of pocket

BROOK MOTORS LIMITED

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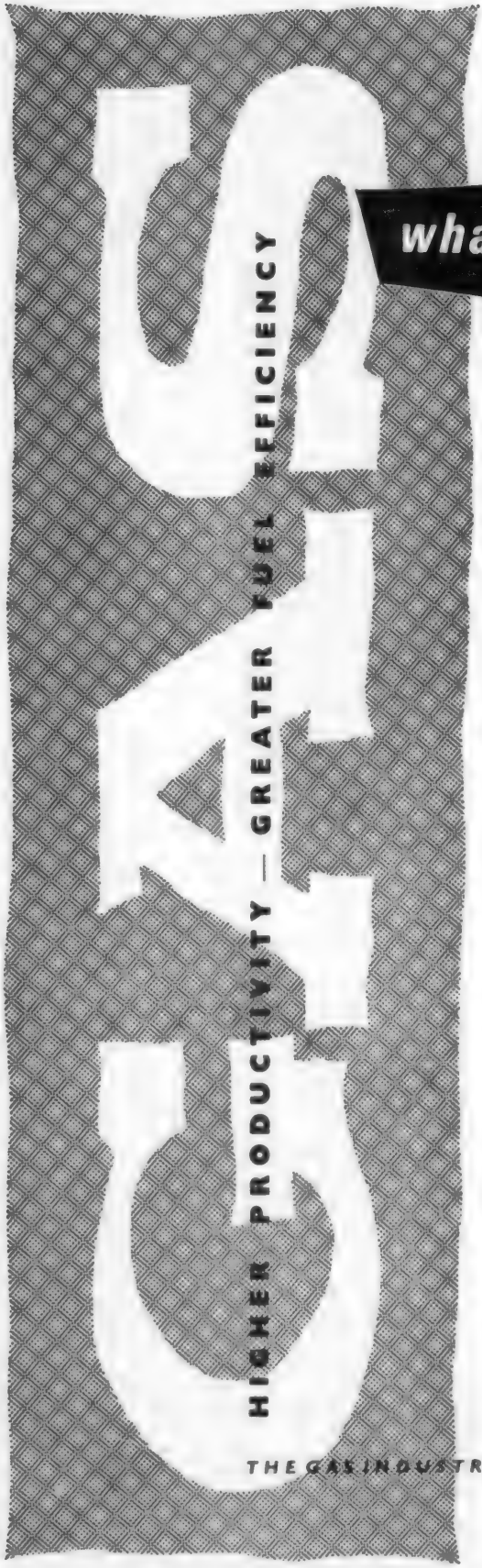

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at each Area Gas Board you will find
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So it is that these Industrial Gas Engineers at
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consult your area gas board

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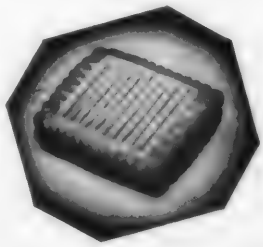

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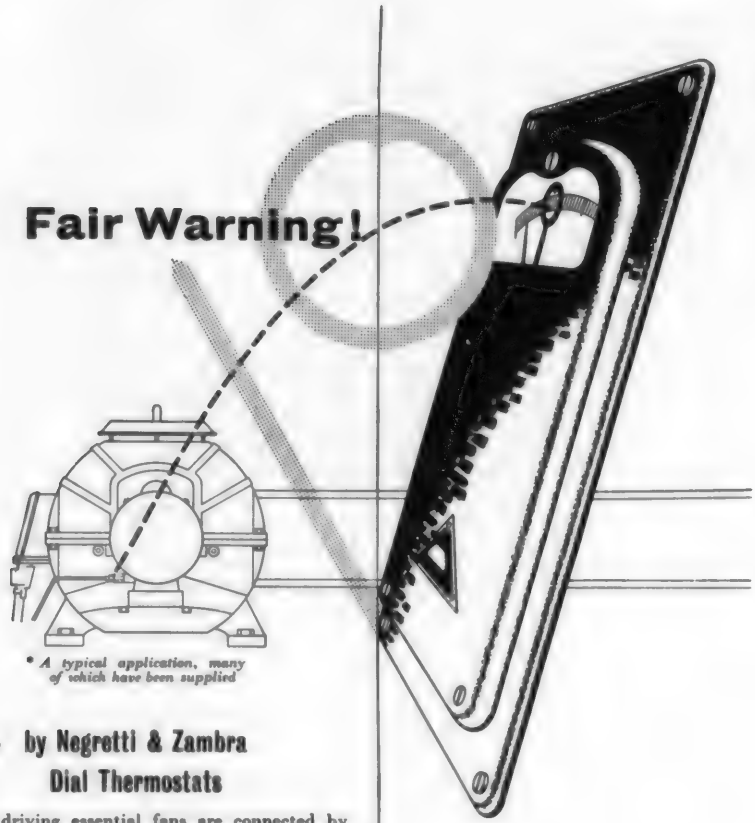
THE GAS INDUSTRY MAKES THE BEST USE OF THE NATION'S COAL

Fair Warning!



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*Motors driving essential fans are connected by mercury in steel temperature systems to N & Z Dial Thermostats on a central instrument panel. If a tendency towards overheated bearings develops, a light on the panel indicates the motor or fan concerned and an audible warning is given. This may be cancelled but the light remains unti normal conditions are restored, when the alarm circuit is reset.

Safeguard your plant and/or process by installing Negretti & Zambra instruments.

NEGRETTI & ZAMBRA

Manufacturers of instruments for the indication, recording, controlling of: Temperature, pressure, liquid level, volume, specific gravity, humidity, etc.

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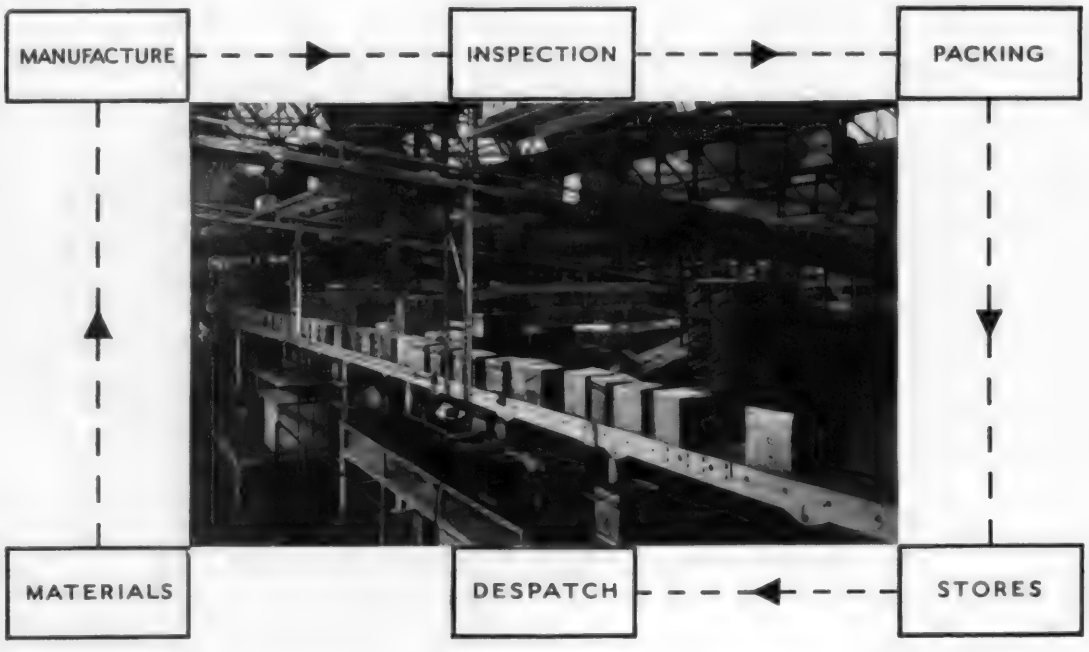
With an efficient distribution of materials, semi-finished and finished products throughout all stages of production by a well planned conveyor system.



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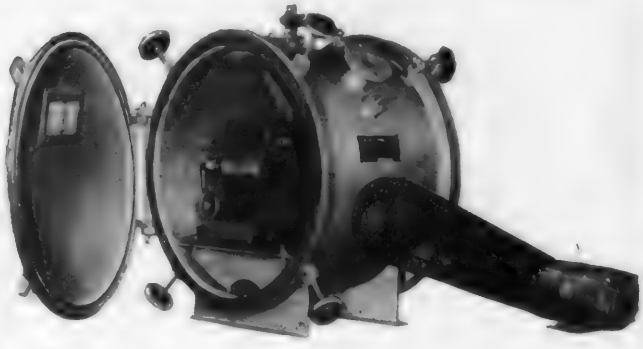
SMALL SCALE FILM DRUM DRYERS



The Mitchell Small Scale Film Drum Dryer has been specially designed for the drying of pasty and colloidal materials, suspensions, liquids, etc., direct from the liquid or semi-fluid state to a final dry powder or flake.

Many firms having such a drying problem to contend with have found one of these small units of great service for carrying out tests and trials under their own control and, for the investigation of new products, in secrecy—thus enabling samples of the product to be available for market reports and sales purposes.

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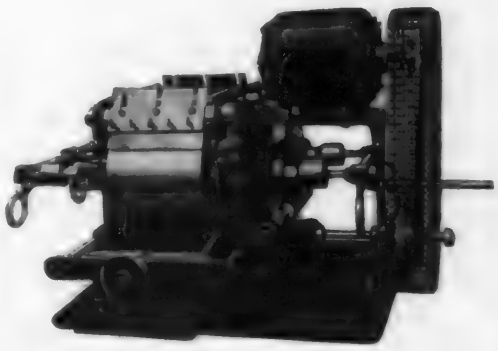

The drying can be done under atmospheric drying conditions, but in order to widen the scope of the machine for handling heat-sensitive materials or products which necessitate special drying conditions, we supply a cylindrical vacuum casing into which the Drum Dryer can be inserted and the drying carried out under vacuum. We also provide the necessary vacuumising set for Research Stations not fitted with vacuum main.

The Small Film Drum Dryer is mainly used where it is desired to produce a finished dry powder or flake without filtration, handling or labour, and is therefore recommended for products which are difficult to filter. It can also be used for handling precipitates where it is desired to eliminate filtration and handling.

These Dryers are installed in such process industries as Starch and Dextrine, Plastics, Chemicals, Fine Chemicals and Drugs, Soap, Foodstuffs, etc., etc., and can also be adapted for chilling and flaking purposes.

Enquiries also invited for Large Scale Film Drum Dryers, Flaking Machines and Chilling Rolls up to 4′ diameter x 10′ long. We invite you to write for details of our full range.

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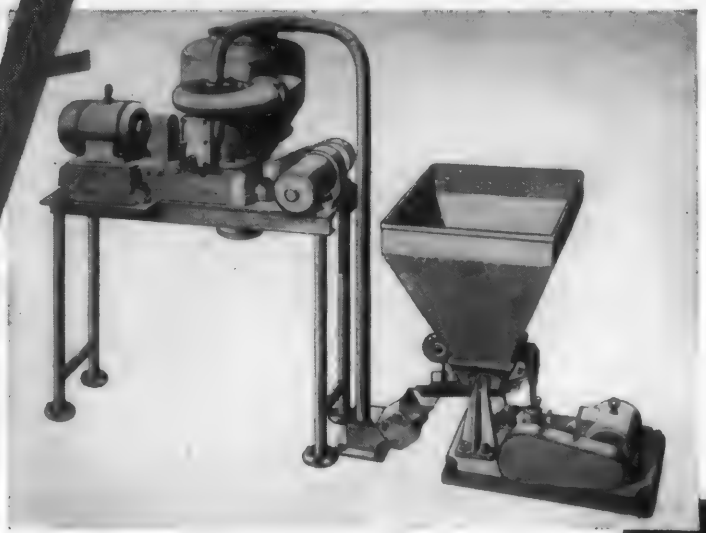
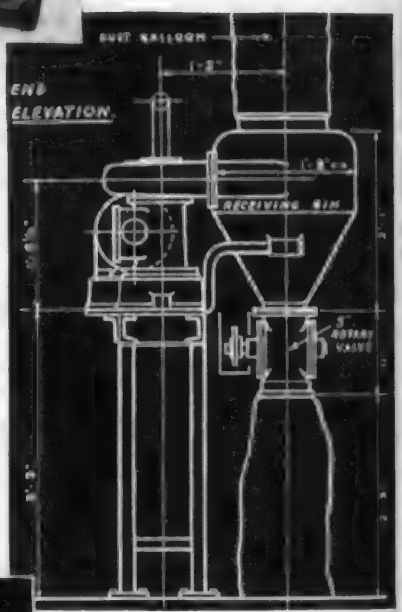
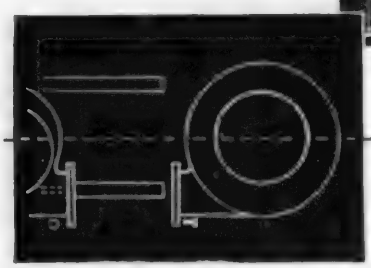
YOU WANT A MACHINE—THAT'S EASY TO CLEAN...





Take a look at the revolutionary involute discharge now fitted to KEK Mills. The quickly detachable cyclone collector and involute delivery ring cut cleaning time by as much as 50%. Then there is the KEK Suction Feed, the simplest and most efficient method of handling all free-flowing materials. And the KEK Rotary Discharge Valve giving genuinely dust-free operation under all conditions.



Tests on samples of your own materials will be carried out in strict confidence and without charge or obligation. Full details of all KEK Pin Disc, Beater, and Kibbler Mills are set out in separate leaflets which are available on request.

KEK Limited

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PALMERSTON STREET, ANCOATS, MANCHESTER, 12

specialists in the manufacture of grinding & blending plant and equipment

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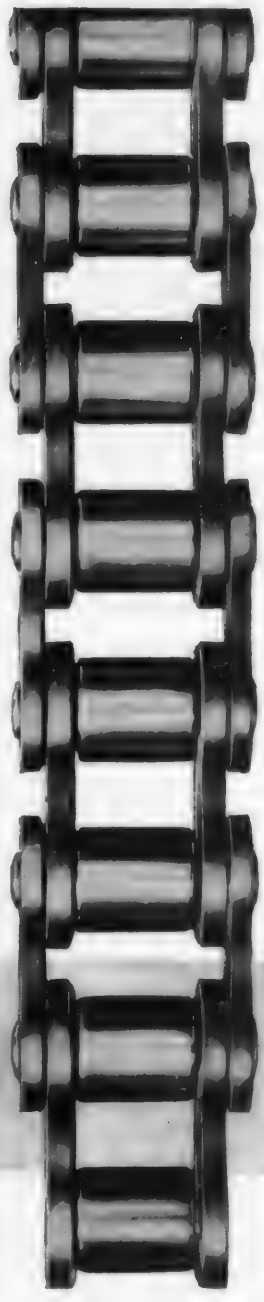

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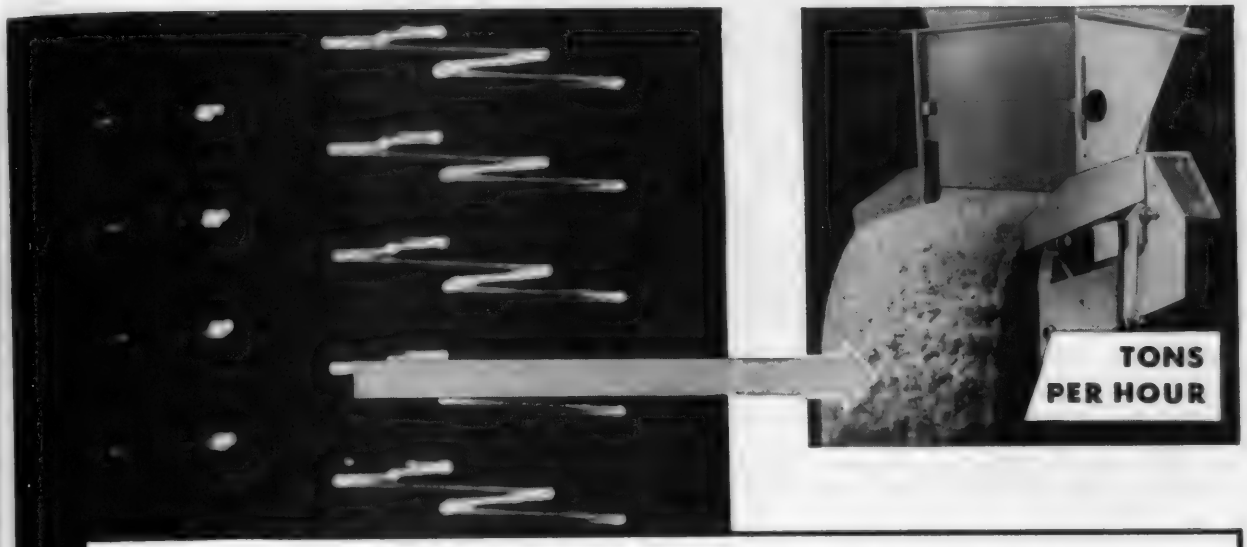

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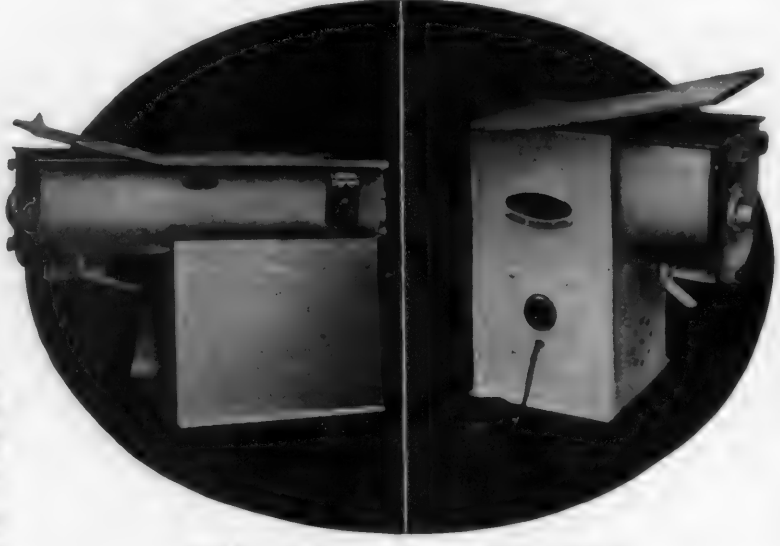

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Filtering costs out of filtering

After eighty barrels of beer have gone through this filter the mats have to be changed. A costly job, as you can see from the size of the filter. To reduce the cost a brewery fitted a Leonard Thermostatic Steam Water Heater to backwash the filter beds instead of changing them. Almost at once 80 barrels went up to 120 before the mats had to be changed, and in a few months was up to 500 barrels. Costs fell from 1/7½d. a barrel to 3½d. and filter mats three grades finer than before can now be used. Everyday we save somebody something. Sometimes time, sometimes equipment, sometimes hot water. Perhaps we can do it for you. Only you can tell. Look around and ask us for details and names of users. Our pamphlet No. J/9 will tell you all you want to know.

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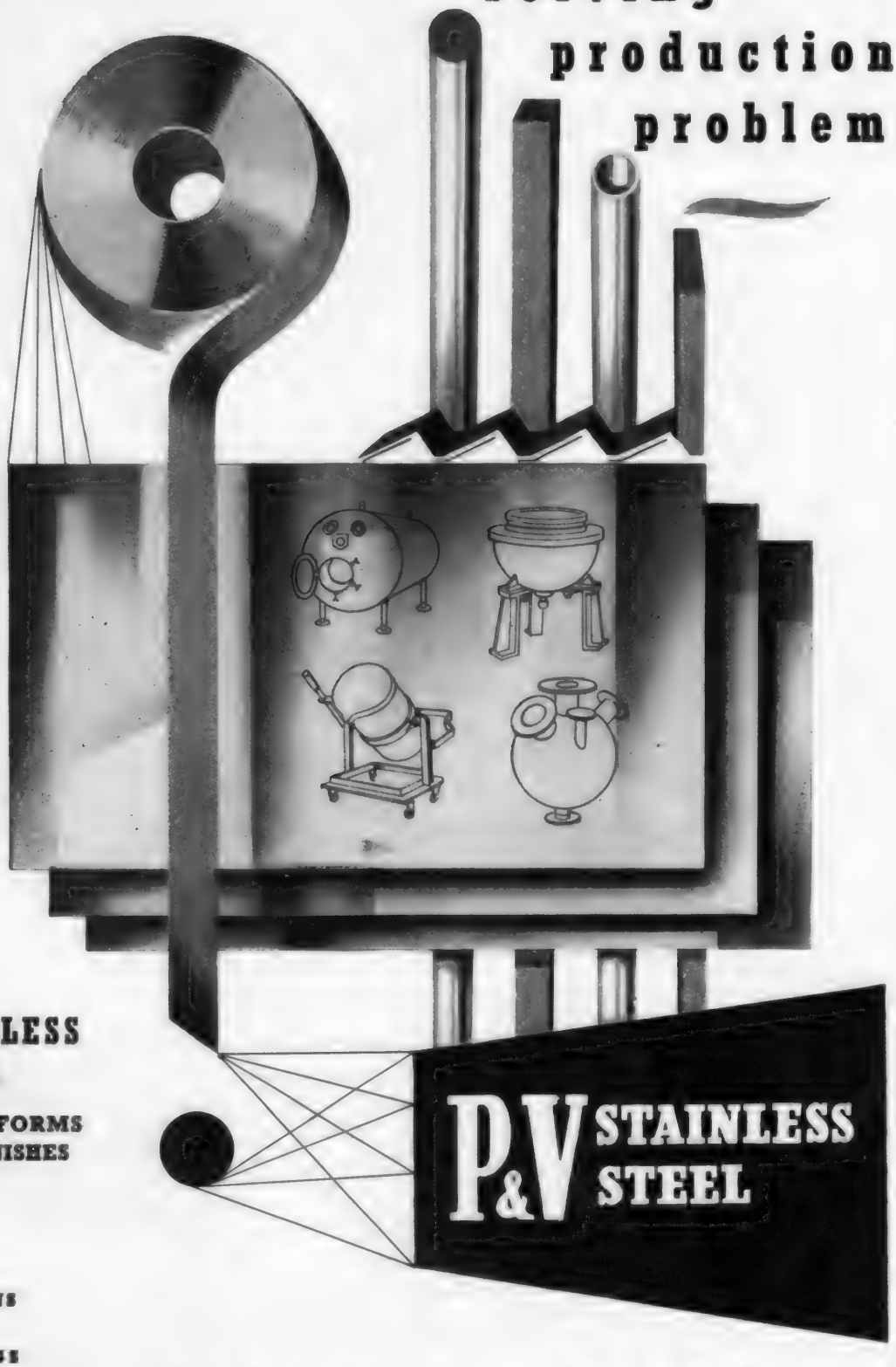

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There are many variants of diaphragm and body material to suit the fluids encountered, also of body and bonnet style to suit purpose and location.

The species illustrated is the Extended Spindle.

Saunders 'K' Valve has many close affinities with genus 'A' and is found increasingly in industries where colloids, magmas, pulps and slurries are encountered.

Inspection of the body reveals the straight bore which enables sticky, solidifying fluids to be rodded or brushed away.

The cone-shaped diaphragm makes hermetic closure, as in the 'A' Valve, trapping any small solids in the supple, impervious substance; from which prison they are freed at the next opening of the valve.

The gay crimson handles decorate many an industrial acre.

For Notes on Cultivation and How to Order

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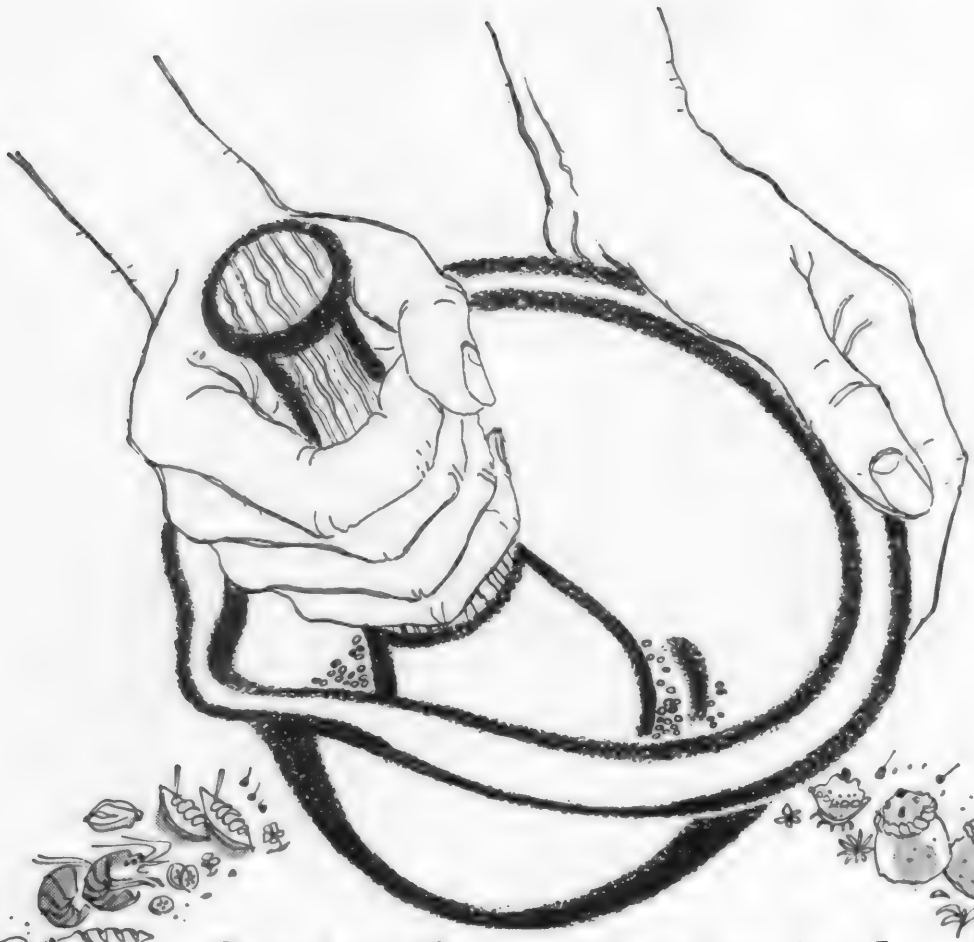

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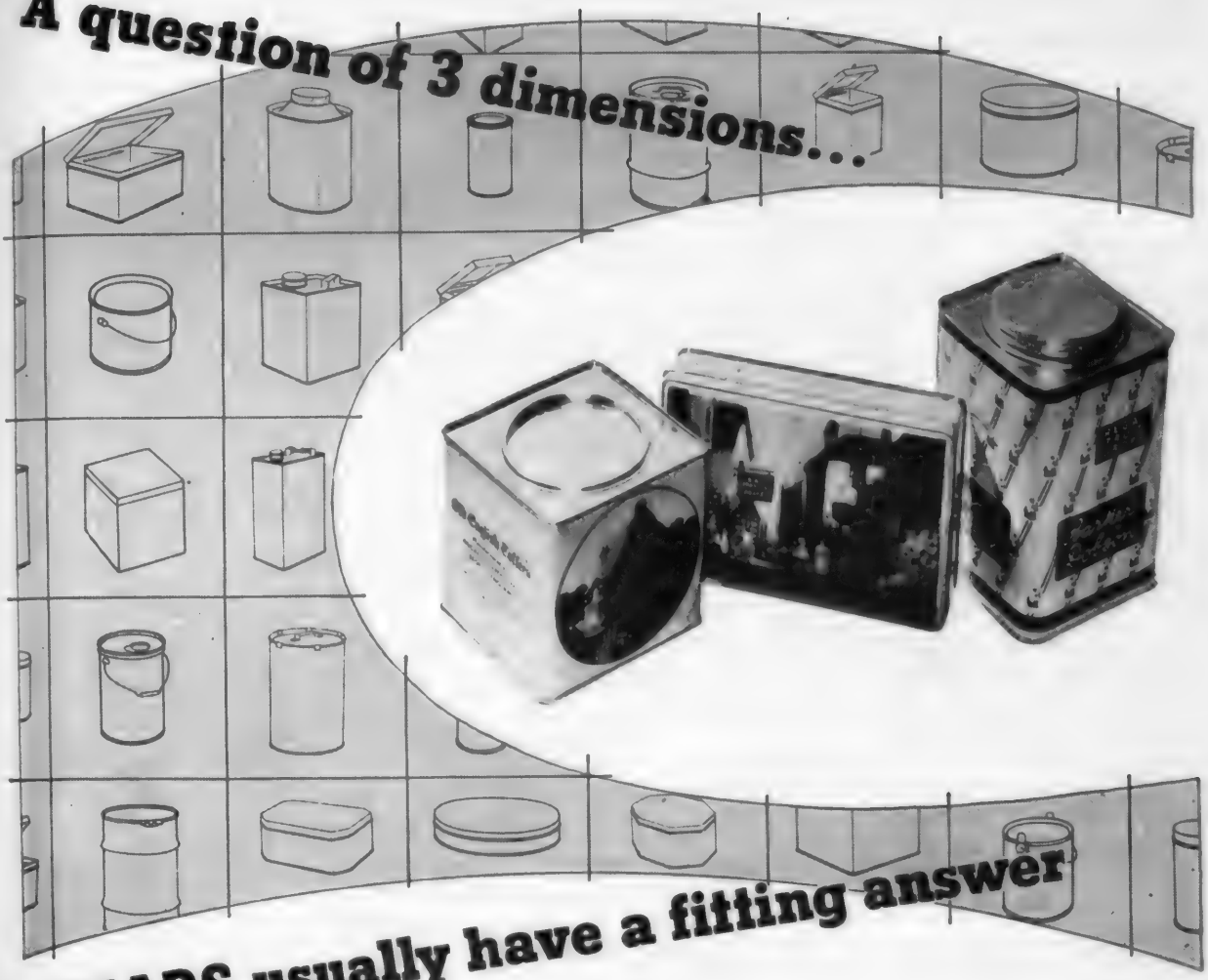

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There is a lot more in fitting a container to a product than just getting the size right. Some products are happy in a plain tin or drum. Others need a special lacquer or enamel lining. Reads can supply the kind of package your customers find most convenient—lever lid tins or canisters, hinged lid tins, special sealing rings or handles, or any of many other features. In fact, from a ½-oz. stamped box to a 50-gallon drum or 500-lb. open-top drum, Reads can supply or design the correct container for your product and its specific market. Write to Reads of Liverpool about packaging.

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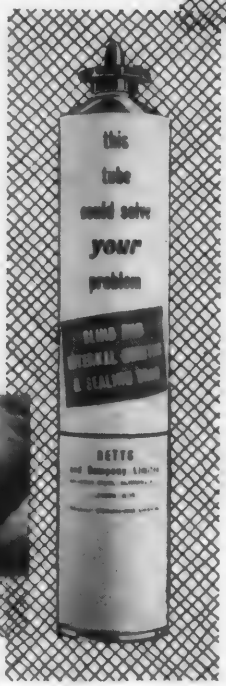

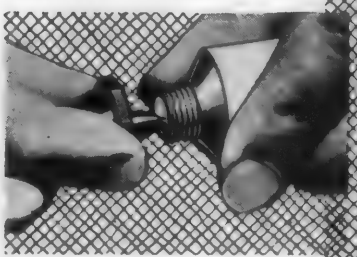

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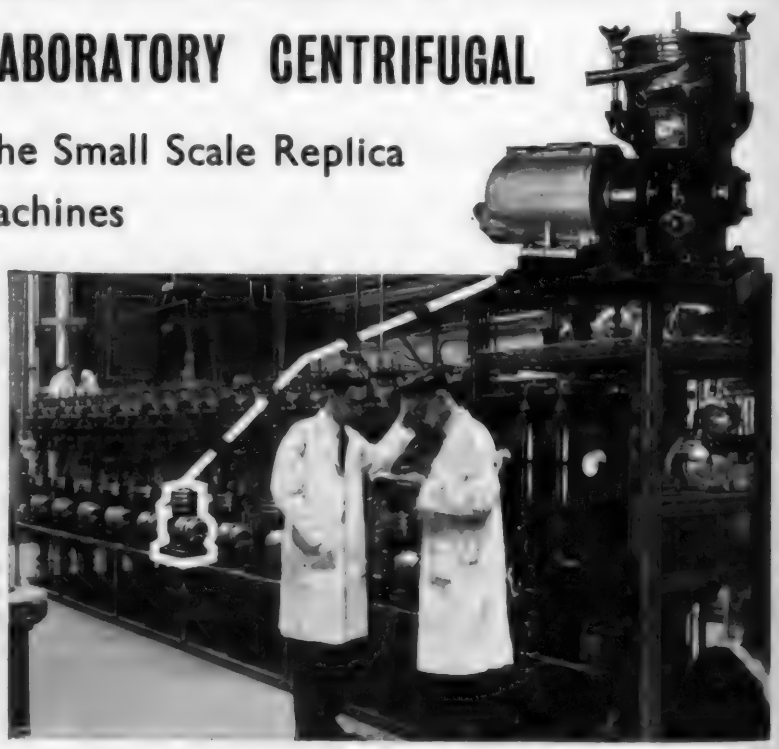

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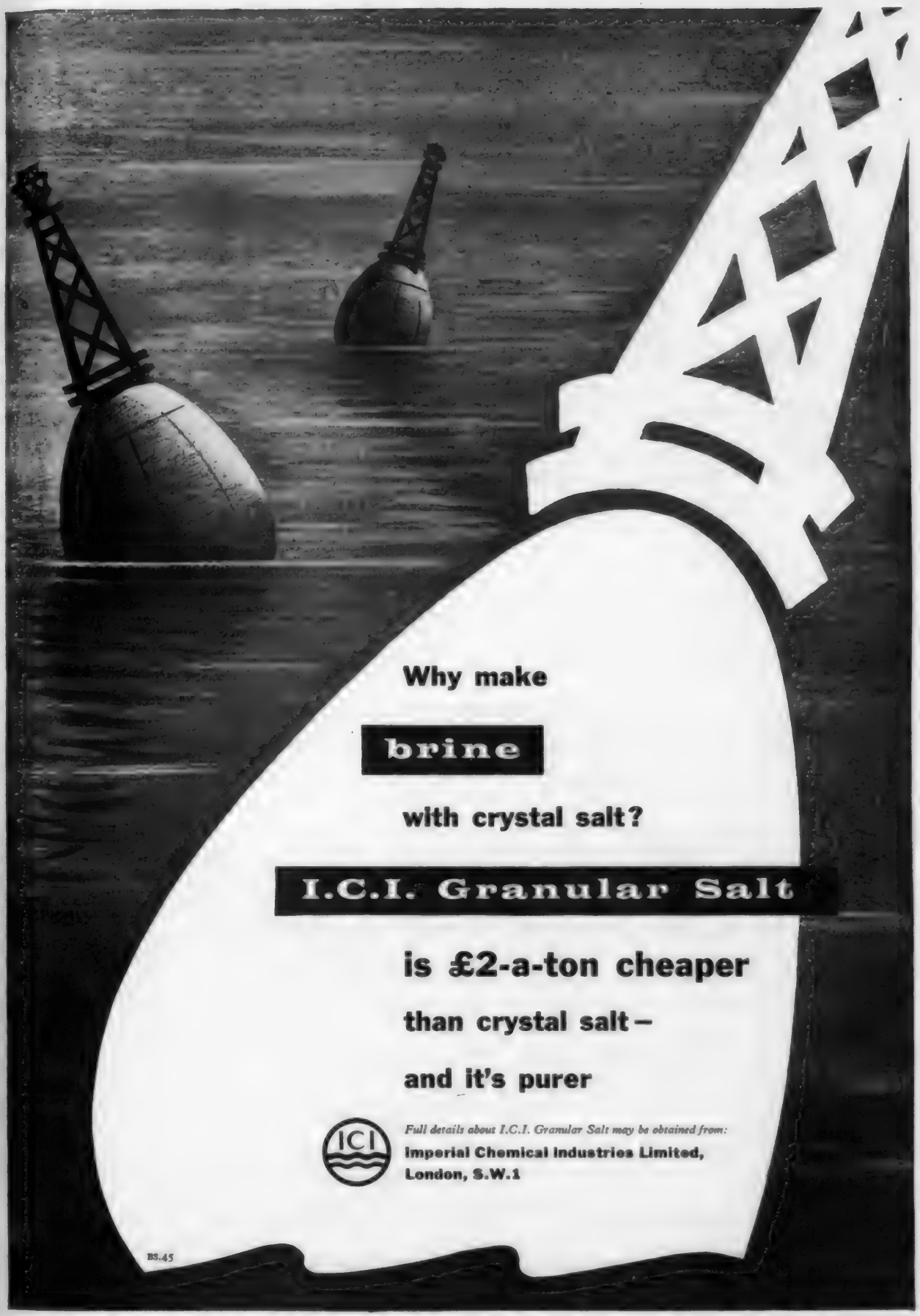
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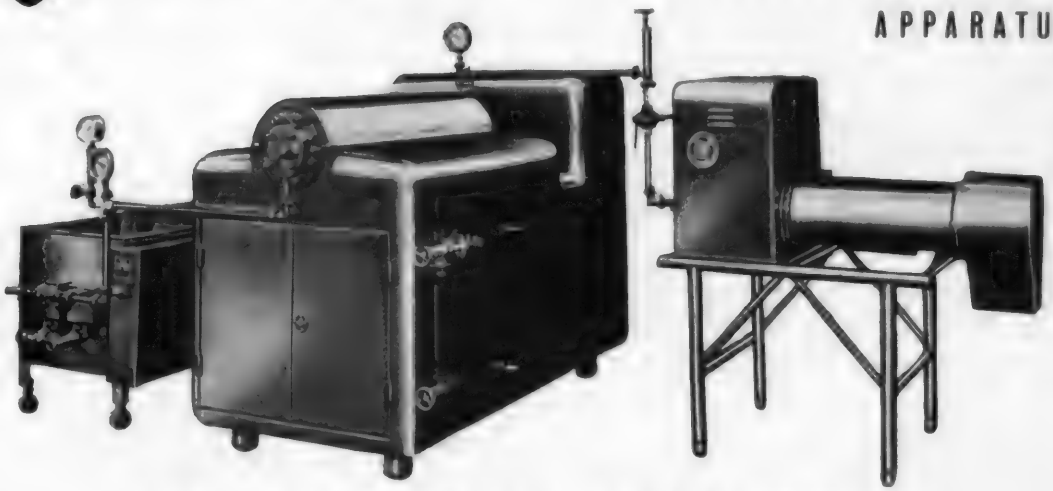
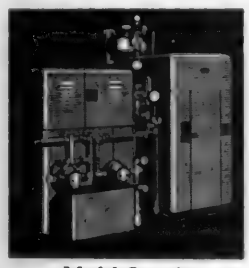


FOR MARGARINE MANUFACTURE



Model S91A

or

"Votator Apparatus" for Shortening or Compound Lard Production

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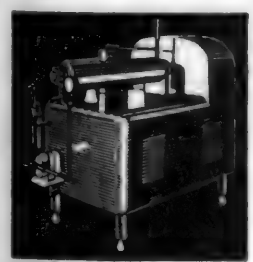

Model MM41W

"Votator Apparatus" for Continuous Production of Marshmallow.

etc.

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The "Votator" system of continuous processing of liquid and viscous food products is the most modern in the world. It incorporates the most advanced heat transfer mechanism known. The cooling area in relation to material is large, thus ensuring clean, constant and uniform production. Substantial savings of time, cost and space are effected which soon pays for installation.

Johnson's engineers have specialised knowledge of the "Votator" system as applied to many forms of food manufacture and a "Votator" pilot plant in Johnson's Laboratory develops and tests processing methods prior to installation. You are invited to see this in action or to study technical information as you wish. Consult Johnson's about it.

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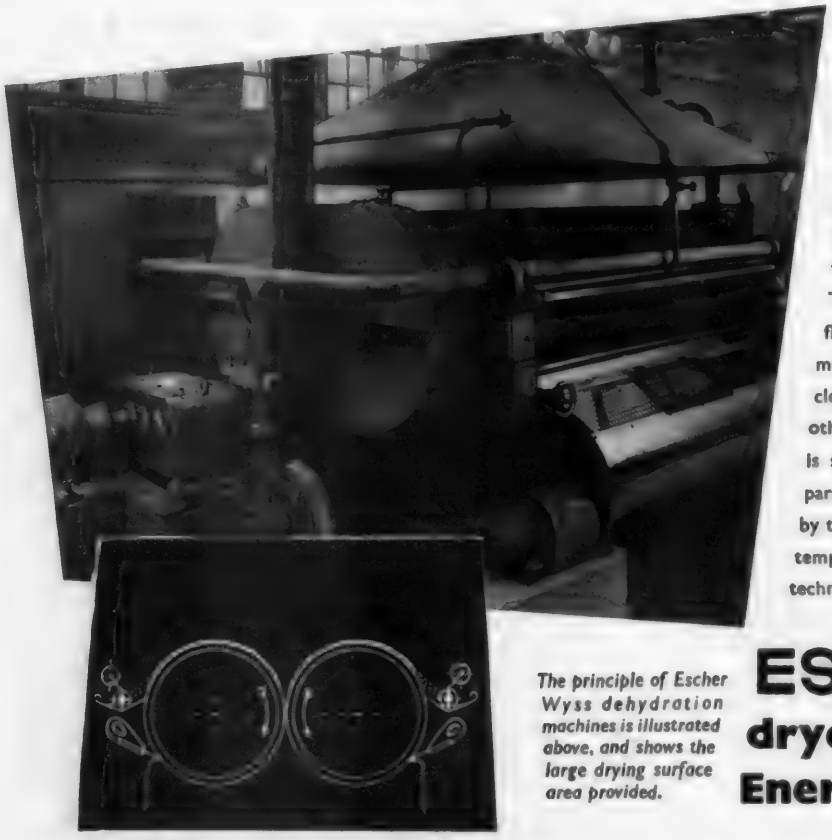

The de-hydration plant installed for Messrs. Energen Foods Co. Ltd. is typical of the Escher Wyss system—the most advanced method of moisture extraction from heat-sensitive substances. Multiple spinning discs pick up the liquid which is thrown centrifugally outwards to the edges of the discs. Two adjacent air jets project the liquid, as a fine mist, on to the drying drum. With this method there are no small pipe lines to become clogged, which is unfortunately frequent with other methods. Because this fine mist of liquid is sprayed on to heated drums, there is a comparatively large surface exposed to the heat and by this means, drying can be speeded up, at low temperatures. We will be pleased to supply full technical details of these machines.

The principle of Escher Wyss dehydration machines is illustrated above, and shows the large drying surface area provided.

ESCHER WYSS dryers at Energen Foods Co. Ltd.

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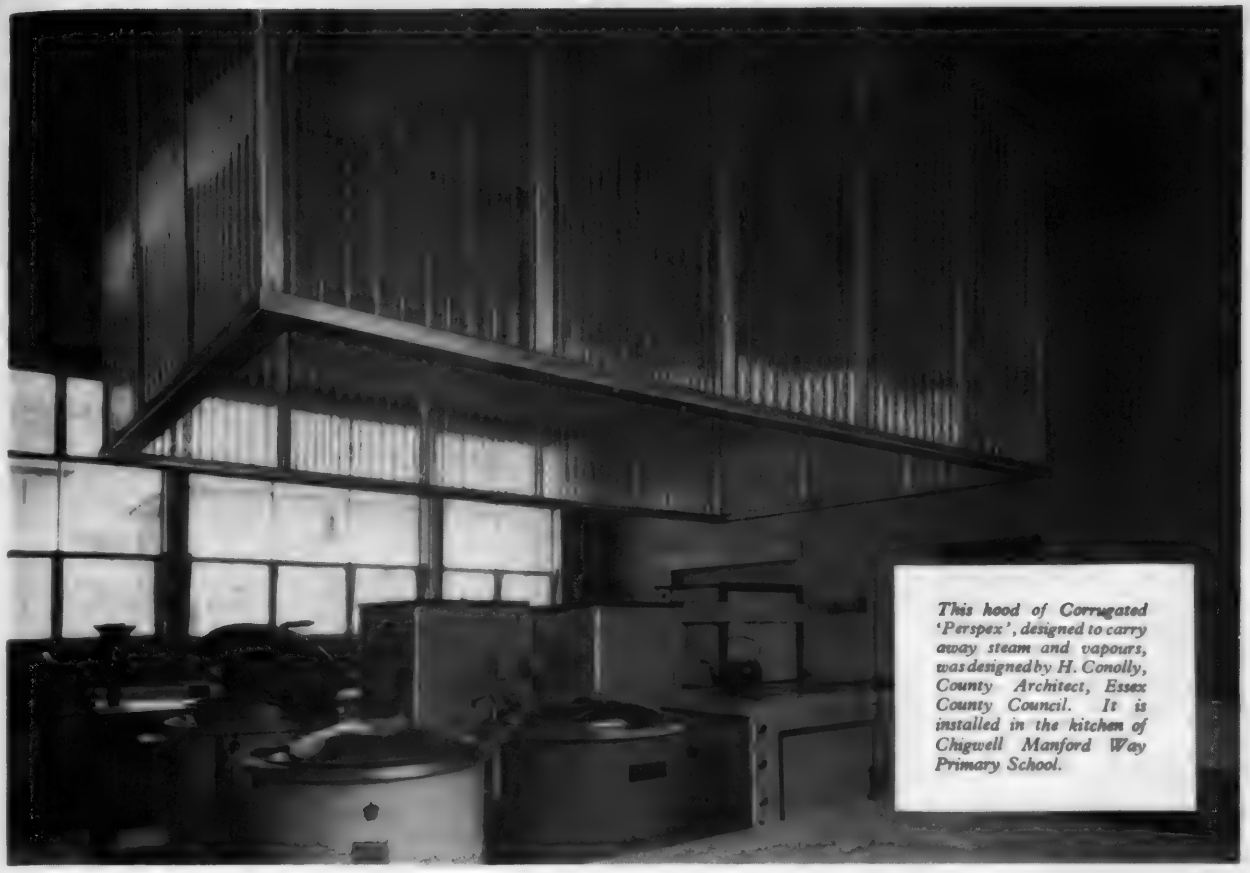

This hood of Corrugated 'Perspex', designed to carry away steam and vapours, was designed by H. Conolly, County Architect, Essex County Council. It is installed in the kitchen of Chigwell Manford Way Primary School.

For light, efficient condensation hoods

use Corrugated 'Perspex'

For condensation hoods in kitchens and food-processing plant, Corrugated ' Perspex ' acrylic sheet is the ideal material. Corrugated ' Perspex ' is easy to install, light in weight, robust, transparent, and has low thermal conductivity.

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Of Dragons, Guns and Waterspouts...

IN MEDIEVAL TIMES sailors regarded waterspouts with great terror. The Chinese, and others, believed these were caused by the violent ascent and descent of dragons. The danger was real enough, for the wind in wild blasts near the waterspout could capsize small vessels carrying much sail. The standard practice for averting this danger was to discharge artillery into the clouds to frighten away the dragon.

Today, goods in transit on land, sea and in the air are not held to be in great danger from dragons. But they are in danger of damage from rough handling and they do need sound protection—reliable packaging. Many leading manufacturers find "Fiberite" cases, and cartons made from "Thames Board", more than adequate to safeguard their products and display them to advantage. These modern packaging materials are the products of many skills and experience unique in the industry.

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FOOD MANUFACTURE

Vol. XXXI. No. 11 · Published Monthly · November 1, 1956

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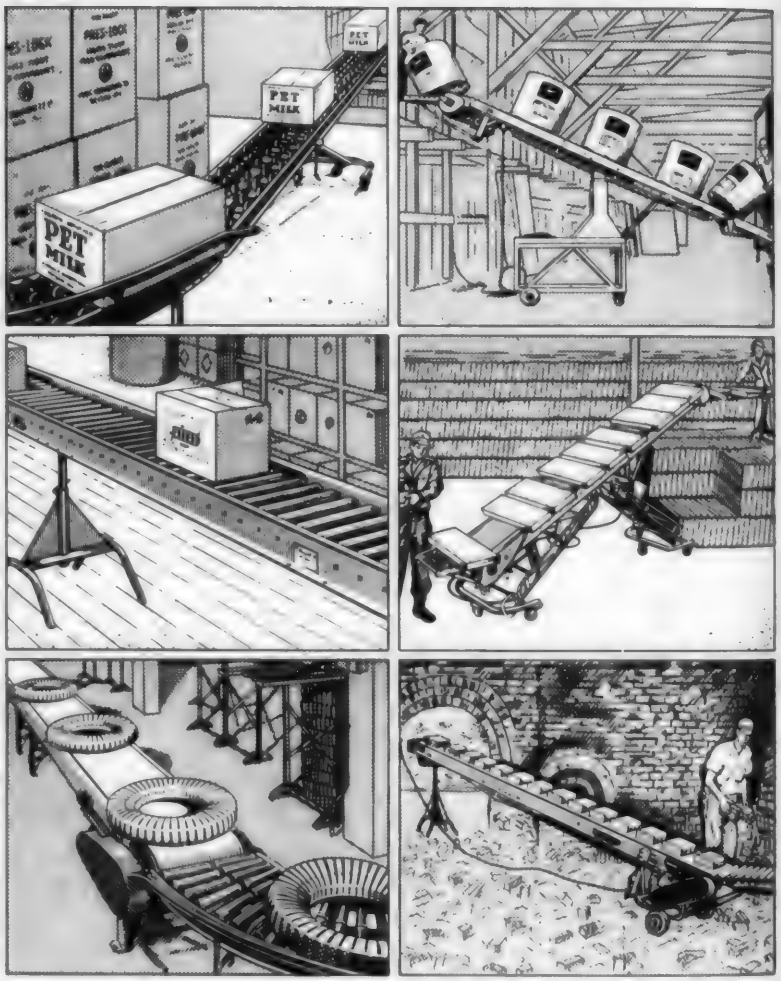

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FOOD MANUFACTURE

Vol. XXXI, No. 11 November 1, 1956

Milk powder predominates

THE GREAT rise in the manufacture and use of milk powder is a remarkable feature of the dairy industry. This increase is higher than for any other milk product. In "Dairy Produce—1956" (H.M.S.O., 5s. net) the Commonwealth Economic Committee state that before the war a total of just over 7 million cwt. of milk powder was produced and that last year the world total was over 24 million cwt.

Higher production and consumption of milk powder, particularly skimmed milk powder, has been fostered by international relief agencies. Frequently they have provided skimmed milk powder for reconstitution with local buffalo milk, as in India, to produce a relatively cheap "toned" milk. Great quantities of skimmed milk powder have been exported by the U.S. Government either free of charge or at reduced prices, but Commonwealth countries probably provide more than half of the commercial supplies. Britain and India are the only major Commonwealth importers. Indian imports have been increasing rapidly and in 1955 she imported 708,000 cwt., approaching the U.K.'s 785,000 cwt. The only other country which imports anything like this amount is Venezuela, which, in fact, is the world's largest importer of whole milk powder. There, rather fewer than 6 million inhabitants consume about 60 million lb. of whole milk powder annually instead of fresh milk.

The pattern of condensed milk production is also changing. Before the war, except in the U.S., sweetened condensed milk formed the bulk of the world's production and trade. A large proportion of the Dutch output was sold in Britain as sweetened skimmed condensed milk and in the Far East as sweetened whole condensed milk. The large rise in the production of unsweetened condensed (evaporated) milk, often at the expense of sweetened milk, is partly attributable to higher output and trade during the war in North America where it has always predominated, and to the lack of demand in Britain for skimmed, condensed milk, the market for which has been almost destroyed by higher incomes, welfare milk schemes and the rise in liquid milk consumption. The world output of condensed milk had declined in 1953 and 1954 because of the relaxation of military demands and civilian stockpiling. There was a marked recovery in 1955 mainly because of greater trade in evaporated milk, especially in the U.S. and Canada. The Commonwealth had a higher share in the world's trade in condensed and evaporated milk, due almost entirely to higher British production which has reduced our imports to negligible proportions and made us the largest Commonwealth exporter. During 1955 British exports of condensed milk rose from 466,000 cwt. in 1954 to 829,000 cwt. The Netherlands are still by far the world's largest exporters with a total of nearly 4·5 million cwt. The second largest exporter was the U.S.A. with a total of 1·5 million cwt. Many Commonwealth countries, such as Malaya and territories in the West Indies, are major importers of condensed milk.

Advance in cheese making

DESTRUCTION of the acid-producing bacteria in cheese starter cultures by phage—ultra-microscopic organisms—is one of the cheese maker's bugbears. The risk of spoilage and loss due to phage can be as high as 4-5% of total production. This could represent as much as 100,000 tons of cheese from the total output of 2 million tons produced by the 12 major cheese producing countries—the U.K., New Zealand, Australia, Canada, the U.S., Sweden, Denmark, Holland, Switzerland, France, Italy and West Germany.

An answer to this formidable problem is claimed by Fisons Milk Products Ltd., by the invention of their so-called phage-resistant medium. It is a calcium-free, neutral medium made from milk in the form of a white spray-dried powder which is reconstituted for use as a 10% (approx.) solution in distilled water. Starter cultures grown in PRM will resist phage, it is claimed. If phage is initially present some will die out during incubation. Many different starter cultures will grow in the new medium. A concentration of phage that will cause complete lysis in cheese milk will not affect cheese making if PRM-based cheese starter is used. It is possible that one of the benefits arising from use of the new medium would be cheaper cheese production since the present elaborate precautions against phage would become less necessary.

PRM was developed by Mr. Bruno Reiter, a bacteriologist of Austrian origin who has studied the phage problem since 1943. He joined Bengers Ltd., now Fisons Milk Products Ltd., in 1950, after 12 years with Kraft Dairies Ltd. The medium is being made in small quantities at Fisons' Coleraine (N. Ireland) factory (which will shortly be described in FOOD MANUFACTURE). By next spring production will be increased to 250 tons p.a. The potential use is considerable. The 12 countries mentioned use some 30,000 tons p.a. (dry weight) of starter culture.

A pioneer passes

"BIRDS EYE" may seem a fanciful trade name for a food. How many people know that it is a version of a man's name? This will have been borne on to many people by the news of the death in New York, in his 70th year, of Clarence Birdseye, the pioneer of quick freezing.

Birdseye was born in Brooklyn in 1886. He had a varied career as a field naturalist, fur trader, and fisheries investigator before he became a refrigeration engineer. His chief contribution to quick-freezing technology was the development of the multi-plate froster. This consisted of a number of superimposed refrigerated, hollow metal plates hydraulically operated to open and receive products between them and then to close. The whole was enclosed in an insulated cabinet. Birdseye began working on this development in 1917, but it was not until 1925 that he had perfected the process and his first commercial pack was not sold till four years later. He first demonstrated his system with fish fillets, but soon expanded to include shellfish, vegetables, fruits, meats and poultry. The products were packed in moisture-proof waxed cartons lined with cellulose film, quick frozen in the multi-plate froster, then transported and sold while still frozen solid.

The new quick frozen food products had a difficult start. Frozen food in general had a bad reputation, there were no distribution channels for frozen foods in small consumer packages, and retailers were not prepared to buy costly display cabinets or to accept small profit margins. It was, in any case, the time of the depression. To the credit of the Birdseye organisation and its parent company, General Foods Corporation, their sales campaigns were highly successful and today the popularity of quick frozen foods is well known.

In 1943 Unilever acquired rights to the *Birds Eye* trade mark and all patents of the multi-plate froster process outside the U.S.A.

Ten years ago the first quick-frozen foods were sold in this country and today 20,000 retailers are selling *Birds Eye* products. Even higher sales are expected as the result of a much heavier press advertising campaign which has been recently announced by Mr. E. Hall, marketing director of Birds Eye Sales Ltd.

It seems that Clarence Birdseye's outstanding achievement was to enhance the reputation of frozen foods. Today the purity of frozen foods is unquestioned and the name *Birds Eye* is synonymous with quality: what better epitaph could a man have?

Cooling poultry

WITH a fine sense of timing, the D.S.I.R. has published a booklet on cooling poultry carcases, thus joining with the department stores and greetings card manufacturers in reminding us that "Christmas is coming" and that not only the geese, but turkeys, chickens and other birds are getting fat.

The object of the paper (Technical Paper No. 4, "Cooling of the Uneviscerated Poultry Carcase," H.M.S.O., 2s. net) is to compare the various methods of cooling poultry carcases for people in the dressed poultry trade, most of which in this country is in uneviscerated birds. The poultry carcase is one of the few that is stored without prior evisceration. However, as is becoming widely recognised in the industry, uneviscerated birds should be cooled promptly and rapidly after slaughter or they will soon go bad. Little information on cooling carcases related to British practice has been available up to now and the authors, Dr. R. S. Hannan and H. J. Shepherd, have filled the gap. They consider dry, contact and wet cooling methods and have investigated the rates of cooling that can be achieved by the various methods available in Britain. So far, information on cooling has dealt mainly with American methods.

The methods in common use are dry cooling in air or an air-blast, and contact cooling. In the first, the air may or may not be artificially cooled. In the second, part of the surface of the bird is pressed into contact with a cold metal surface (at about 10-15°C.). Contact cooling is no faster than with slowly moving air at about 0°C., at least as regards the deeper tissues, but it has the advantages of relative simplicity and cheapness.

The effect of cooling birds by immersing them in a mixture of ice and water is also considered, although the method is not often used in this country. If the aim is to cool the most vulnerable parts of the carcase to a low temperature as rapidly as possible, the ice and water method is the best to choose. Its efficiency, however, is not much greater than that of a blast of air travelling at about 200 ft./min. or more. Both methods are more costly than those in current use in this country. The main difference between them is that a bird cooled in air loses weight, and a bird cooled in ice-water gains weight.

Vinegar pickled meats

VINEGAR pickled pigs' feet and similar delicacies are popular on both sides of the Atlantic but, according to C. F. Niven of the American Meat Institute Foundation, the tedium of proper curing and pickling and the relatively low value of the products tends to make some manufacturers rather careless so that they have difficulties in achieving proper colour fixation. Vinegar pickled pigs' feet and sausages, which have similar spoilage and curing problems, are considered by Dr. Niven in a booklet published by the Foundation—"Vinegar Pickled Meats."

Some of the problems are chemical in nature and are due to faulty curing and processing or oxidation of the cured meat pigment. Others are of microbial origin.

A common form of discoloration is when the skin of the product has a dull, greenish colour while the lean has a deep brownish cast. Even the pickle itself may have a greenish cast. This is caused by nitrite burning when too much nitrite is present at the time of adding the vinegar. A brownish cast to vinegar pickled sausages is due to the same reason.

Faded skin of pigs' feet or the cut ends of sausages may be due to under-curing or to autoxidation of the cured meat pigment. Ascorbic acid seems to delay fading.

Turbid and ropy vinegar pickles are caused by the growth of acid-tolerant micro-organisms. These originate primarily from surface contamination of the processed sausages as they are prepared for pickling.

The formation of gas sufficient to dome or lift the caps from the jars may arise both from chemical reactions and microbial fermentation.

1706-1956

QUARTER-MILLENNIUM celebrations were held last month by two London food companies, curiously enough on consecutive days. Twinings in the Strand held a reception to mark the 250th anniversary of their tea and coffee business which began when Thomas Twining bought Tom's Coffee House in 1706, while Crosse and Blackwell celebrated their 250 years with a "culinary adventure," a luncheon served in the style of the early eighteenth century.

Two lines of a verse by Sir Alan Herbert in honour of the occasion convey the essentials of Twining's celebration:

> Two-fifty years! Same trade—and same address
> Same family! Is this a record? Yes.

Thomas Twining, in whose memory a plaque was unveiled, started the business now carried on by his descendants of the seventh and eighth generations at a time when the coffee house was an important feature of London's society—even more so than the modern counterpart with its Espresso machine and rock 'n roll patrons. Tea, however, was not so popular nor so highly regarded, and Twinings are especially proud that their story "is the history of how the tea cup replaced the ale flagon at the breakfast table, how a sinful infusion became the drink of the virtuous."

Crosse and Blackwell's guests were served with boar's head, roast suckling pig, swan, sturgeon in wine, syllabub and other eighteenth-century delicacies, accompanied by sack and mead. The occasion was further marked by the publication of a book, *Home Cookery*, designed to be of practical help to the housewife of 1956.

The business originated with a Soho firm of oilmen and salters. The present name came when two "industrious apprentices" (Mr. Crosse and Mr. Blackwell) bought the goodwill of the company for £600. Catering mainly for the luxury trade and with a keen appreciation of the value of advertising, they drew the attention of the nobility and gentry to "the highly celebrated Soho Sauce" and other delicacies with such success that within 15 years the capital of the venture had to be increased to £26,000. Today the Crosse and Blackwell group produces over 100 foods and has factories in England, Scotland, the U.S.A., Argentina, South Africa, Belgium and France.

Fish flour offer

A PRACTICAL step to alleviate malnutrition in underdeveloped countries is the offer of an American company to invest capital and build a plant for the production of fish flour if any official agency agrees to buy 1,000 tons a year or more for a three-year period. The price would be 12½ cents per lb. f.o.b. any eastern port in the U.S., and the specification would be guaranteed. No capital outlay by the agency would be required.

The offer has been made by the Viobin Corporation of Monticello, Illinois. They point out that so-called "meat" quality protein is essential to three-quarters of the world's population. Hunger is most often hunger for quality of protein, not quantity; 7·5 g. (equivalent to 10 g. of fish flour) of "meat" quality protein added to the inferior protein they now eat will prevent kwashiorkor. Viobin state that 27 million metric tons of fish are now harvested annually and that 46 million additional tons per year would provide 10 g. of fish flour for all the people in the world who need "meat" quality protein to prevent kwashiorkor. Such a quantity is more realistic than it seems because the Viobin process uses any fish of many species not now used for human food,

e.g., shark, hake, tarpon and porpoise. Furthermore, a Viobin factory can be erected on a ship to sail the fishing areas, supplementing shore factories.

Nutritionists have already reported (*see* FOOD MANUFACTURE, April, *p.* 130) that bread baked with a percentage of fish flour is palatable and nutritious. Viobin, who have been processing animal tissues for 10 years, claim their method to be unique in that it processes the whole fish—any species of any oil content—into a stable fish flour (75% to 80% of protein) of high biological quality (less than 1% fat) with perfect keeping qualities for an indefinite time in any climate. The flour can be deodorised if required without vitiating its biological qualities and can be easily added to cereal products. Viobin have a plant at Lofoten, Norway, producing fish meal which can produce fish flour, and are building a similar plant at Salina Cruz, Mexico. Exactly the same plant that produces fish meal will produce fish flour, the extra cost of the fish flour being due to the fact that it has to be handled as human food and has to be selected, as well as additionally processed to deodorise. Fish flour can be produced at a profit in a plant handling 60 tons of raw fish or more per day for 12½ cents per lb. in the U.S., and for about 8 cents per lb. in other countries. The determining factors are the costs of fish, fuel and labour.

Spicy history

SPICES have the most romantic history of all foods and even today names like pimento, cinnamon, coriander, sesame and turmeric are exotic and evocative. Most people are at least vaguely familiar with the Biblical associations of the spice trade, recalling the glories of Solomon and the Queen of Sheba, and are aware of its historical significance; the desire to find new sources of spices inspired many of the 15th- and 16th-century explorers and, to a certain extent, was responsible for the discovery of North America.

Today the value of spices in world trade is relatively small but they contribute much to our enjoyment. A survey of the spice trade has been prepared by the Imperial Institute as one of its Commodity Leaflets (No. 26). Written for the layman, it has the virtues of brevity, clarity and accuracy. After an historical introduction the report gives short but lucid descriptions of the chief spices with illustrations of the plants from which they are produced.

The leaflet admits that although the term "spice" is well understood, it is not an exact classification. Spices are defined as aromatic or pungent vegetable substances used to flavour food and whose essential feature is a distinctive volatile oil. Yet many things fall within this definition, for example horseradish or nasturtium seeds, which are not, by common consent, regarded as spices. There is some difficulty, too, in distinguishing between spices and condiments, and lists compiled by authorities do not agree. For most people, spices are the exotic products of tropical lands and those on which the spice trade was historically centred.

Discovering Mrs. Beeton

MANY a husband whose wife left him a few days to fend for himself while she visited relatives will remember his dilettante culinary efforts before discovering a restaurant suiting his digestion better. Quite a few, too, will recall their first reference to Mrs. Beeton's mighty compendium, a volume increased in size over the years, yet still dominated by the exhortations of the indefatigable Isabella.

A first browse in an armchair with the hefty volume is an eye-opener. The would-be amateur chef-housekeeper is off on the wrong foot from the start; for, "The duties of the cook begin with early rising: at six a.m. in summer and seven in winter." "Go every morning to the larder; take notice if there is anything not likely to keep" is another of Mrs. B's rules, as likely to be forgotten as the one on washing up "as you go along; don't leave accumulations to be dealt with at the end of the morning, or perhaps at the end of the day." (Or week, if our beloved stays that long!)

"A place for everything, and everything in its place" is another remark, obviously referring to the first day in our case, particularly if Isabella is referring to the pile-up of porringers, pots and pans and odd utensils. As for hints for emergencies, one forgets the cooking to come while reading the infinite variety of troubles ahead. "Ants, to get rid of" will prove easy meat for a chemist armed with boiling water or carbon tetrachloride. To deal with "choking children," simply hold them upside down and smartly slap on the back. Or for a chimney on fire, a few handfuls of salt or a wet blanket—probably not the first wet blanket in our day of trial!

Turn to the recipes and what a feast there is—for our imagination at any rate! Benevolent Soup, Blackbird Pie, Brown Boots, to dye black (sorry, wrong line!), Cabbage au Gratin, Faggots, Flans and Frizzled Beef with Frothy Sauce: so the triumphant discoveries go on. Larks Grilled "prepared as in Larks Roasted" seems a bit of a lark to us, as does Parrot Pie, prepared from one dozen long-tailed tropical parrots, six thin slices of beef, bacon, etc.

And so it goes on, from "Sucking Pig roasted" to "Sucking Pig, how to scald"; all very professional and causing the mere amateur to stick to Frizzled Beef. Then, after the feasting, an appropriate paragraph on Indigestion, informing us that "fancy" articles of food should be avoided. Fancy that!

CHEESE MAKING
The Biggest Factory in the World

By Dafne Treneman

At United Dairies' Factory at Bailey Gate, Dorset, a decade of mechanisation has taken much of the hard work out of cheddar cheese manufacture.

AT Bailey Gate, in the heart of the Dorset countryside, stands the largest cheese factory in the world, which in peak periods manufactures 53,000 gal. of milk a day into cheddar cheese. It is hard to realise that forty years ago, when it was taken over by the United Dairies, the original creamery dealt with less than 2,000 gal. of milk a day.

The factory layout is simple and all departments, apart from the offices, are on the ground floor. The reception platform, where the incoming milk is received, is open on three sides giving plenty of room for lorries to back up and unload, and is highly mechanised. The pasteurising room consists of two stainless steel pasteurisers, which together can deal with 4,000 gal. of milk per hr., and two 3,000-gal. storage tanks, at one end of the room and in which milk is stored overnight if necessary.

After pasteurising the milk goes to the vast cheese room, which contains 33 950-gal. capacity stainless steel cheese vats. Next door is the press room, which is surrounded by a raised conveyor belt. In here the moulds are filled with curd, weighed and pressed, and 24 hr. later emptied. Situated some way from the main building is the large cheese store, which has a capacity of 78,000 70-lb. cheeses. Lining the road to it are the laboratories where the starter is tested and manufactured, and where all routine bacteriological and chemical tests are carried out on the milk. The boiler house opposite contains two coal-fired chain grate type boilers which have a total capacity of 55,000 lb. evaporation per hr. Refrigeration is carried out by five compressors, and the factory produces half its electricity requirements. The effluent is

(*Above*) **Turning the curd.**

(*Right*) **Turning the cheeses.**

taken care of by their own trade effluent plant situated at a suitable distance from the main buildings, and this can deal with 1,250,000 gal. of effluent per week.

The floors in the cheese room are reinforced concrete granolithic covered. Most of the lighting in the factory is strip lighting.

Throughout the factory strict attention is given to cleanliness, and several staff are occupied solely with the cleaning of the various departments.

Production routine

The milk arrives at regular intervals during the day in lorry loads of 10-gal. churns, and on arrival it is tested for taint, cleanliness and keeping quality. Frequent regular tests on butterfat and solids content are also carried out. The milk is then tipped and pasteurised, *i.e.* the milk is heated to about 162°F. and held at that temperature for 15 sec. It is then cooled to 70°F. and run straight into steam-jacketed cheese vats. The large number of vats allows a 10 min. interval in the process of each succeeding vat to ensure a smooth production line.

As soon as the vat is full the milk is tested and 1¼% "starter" (a special culture of lactic acid producing organisms) is added and thoroughly stirred into the bulk milk which is slowly heated to 88°F. After an hour rennet is added to clot the milk into a curd which is cut 45 min. later, the first cut being made by manually operated American curd knives, after which cutting continues automatically with special knives attached to the new swing paddle type mechanical stirrer (which is very simple and carries no overhead gear to collect dust and oil which ultimately might fall into the cheese). After 10 min. these knives are removed and the scalding process starts, during which the mechanical stirrers are in constant movement.

After an hour the temperature of 102°F. is reached and the heat is turned off, though stirring continues for another 20 min. before the curd is pitched—that is, allowed to settle in the bottom of the vat, and the whey is drawn off to be manufactured into various by-products. The curd, which has coalesced, is now cut into large blocks and turned, being laid down each side of the vat. After 10 min. it is turned once more and then cut into slices which are piled two high and turned at regular intervals to allow free drainage of whey and to even the pressure as the curd shrinks and matts together and the acidity increases to expel the whey. When ready for milling at 0·68% acidity, the curd has consolidated and is silky in texture and will tear into leaves. It is then transported by trolley to the new curd cooler salter mixers in which the curd is milled by a "chip" type mill (found to be much superior to the more common peg mill) then drops on to a moving belt, which takes it under the salter. The curd continues to the top of the belt from which it drops to a second belt. This, in turn, takes it back to the first belt and drops the curd behind the salter. This circulation and mixing continues for 10 min., after which the curd is returned by chute to the trolley and wheeled to the mould filling department.

Cutting the curd.

The moulds are filled, weighed and run into a pre-press at the rate of one every 15 sec. The pre-press gives a preliminary squeeze of 400 lb. per sq. in. and drives out the free moisture. The moulds are then conveyed to the gang presses and placed on their sides, end to end. Oil pressure is applied to the hydraulic ram and the cheeses are then pressed with up to 8 tons pressure. Shortly afterwards hot water is sprayed on the outside of the moulds. This scalds and closely matts and seals the cheese coat. After an hour the pressure is released. The cheeses are dressed and the cloth lining adjusted, and with pressure on once more the cheeses are rescalded and left for 24 hr. They are then taken from the press and the inside bandage is removed. The cheeses are stamped with date of make and sent to the cheese store. The used cloths are mechanically washed and sterilised and dried, as are the moulds, which are then conveyed to the moulding room to be filled once more.

Handling

The new cheeses are loaded on to double three tiered pallets holding 24 cheeses and taken to the cheese store, several hundred yards away from the factory proper, by an auto-truck. At the store a fork lift conveys the pallets and stacks them, three high, on

either side of a main gangway, This operation calls for very accurate work by the fork lift drivers, because of the confined space. The store is divided into four parts by rubberised double swing doors and is kept at a temperature of 50°F. with a humidity of 85°. The pallets themselves are ingenious in design. They were devised by United Dairies and the Reflex Engineering Co., Bristol, and are marketed by Desco. They have an easy turn ratchet so that each side of the pallet can be turned in one movement, thereby avoiding the manual turning of each cheese every day during the first part of the ripening period. The cheeses are ready for sale in four months.

The United Dairies have concentrated, in the last decade, in finding mechanical devices to take the hard work out of cheese manufacture, and there is no doubt that they have been successful with mechanical cutters and stirrers, cooler salters and four-piece collapsible moulds; the latter being machine washed.

One of the major difficulties in cheese manufacture is the possible destruction of the starter organisms by bacteriophage. A great deal of work has been carried out at Bailey Gate to find the most effective ways of preventing bacteriophage contamination, and methods now used for starter production are revolutionary and most successful, so much so that starter failure here is now a thing of the past.

The factory employs over 250 people, mostly men, except for laboratory and canteen staff. An excellent canteen not only provides largely subsidised hot meals but is of sufficient size to be used for social functions such as meetings of the Sports and Social Club. The changing room has numerous showers attached to it which the men are encouraged to use.

Labour-management relations are excellent, and this is in no small way due to Mr. Walker, the present manager, who has been making cheese for over twenty years.

Automatic curd mixer/salter.

SOME SUPPLIERS OF EQUIPMENT

Pasteurisers: *A.P.V. Co., Ltd.*
Pallets, cheese vats, curd cooler salter, mixers: *Dairy Supply Co., Ltd.*
Boilers: *Babcock and Wilcox, Ltd.*
Refrigeration: *United Dairies Eng. Co., Ltd.*
Forklift trucks: *Ransomes, Sims and Jefferies, Ltd.*

Curd Fusing Machine Speeds Cheddar Cheese Making

A MACHINE for mechanically "cheddaring" curd has been developed in Australia. It presents a means of achieving the more complete mechanisation of the Cheddar cheese making process, hitherto restricted mainly by the awkward nature of the cheddaring stage, in which large masses of curd must be held for long periods (1½ to 2½ hr.). If vats are set every 20 min., a cheddaring machine would be required to hold the curd from about six vats. The large capacity thus called for would render the machine cumbersome, expensive and impracticable.

Attempts to do without the cheddaring stage were not successful from the point of view of commercial application, and so the new method of Cheddar cheese making, developed by workers of the Dairy Research section of the C.S.I.R., Melbourne, retains the cheddaring stage. But, by the use of higher temperatures, it reduces the time to 30 min., which makes mechanisation practicable.

Studies of the behaviour of the curd during cheddaring showed that application of slight pressure to the curd and its deformation or flow were necessary. It became apparent from experiments carried out that the simplest form of the machine sought would be one which would screen the curd and pre-fuse it by pressure in the first stage and deform the mass of curd in the second stage. The first stage could be carried out in a perforated vessel into which the curd and whey slurry would be pumped from the vat. The whey would flow out through the perforations and the trapped curd would be compressed into one mass. It would then be transferred to a vessel of larger cross-section where it would flow under pressure and undergo further fusion.

A machine has been devised which consists of two vessels placed one above the other, the first being a cylinder at an angle of about 45° and having part of its upper wall perforated with small holes. This cylinder is closed at both ends by perforated plungers

operated hydraulically. Under this cylinder and connected with it is a chamber, oval in cross-section, also closed at each end by plungers. The bottom part of one plunger is perforated. The longer axis of the oval cross-section of the chamber is about twice the diameter of the first cylinder. Both the first cylinder and the chamber have at their lower ends trough-like extensions for collecting the whey.

Curd and whey slurry are pumped into the cylinder, the curd being retained, while the whey flows out. When all the curd has been trapped one of the plungers moves forward compressing the curd in the whey against another plunger. Both plungers maintain slight pressure on the curd. In about 10 min. the curd mass is sufficiently knitted to undergo deformation.

The curd then undergoes further manipulation by the various plungers, as it passes through the chamber, and is finally forced out of the machine. The curd is now ready for milling or slicing into smaller blocks. In Cheddar cheese making the curd would be treated after milling by a machine of the "Desco" type or by a special machine which has been developed.

This noteworthy advance in cheese making knowledge was described by J. Czulak and L. A. Hammond in the *Australian Journal of Dairy Technology* for April-June, 1956, when it was reported that the first experimental model of the curd fusing machine was under construction. It will have a throughput of about 100 lb. of cheese per 15 min. A full commercial model would need a throughput of about 1,000 lb. of cheese per 15 min. in order to take in at one filling the curd from a 1,000 gal. vat. The machine is designed to work in conjunction with the existing factory vats. A commercial model would differ from the experimental one only in that it would have, depending on the capacity of the vats used, a number of cylinders and chambers side by side as one unit.

Margarine and other Fats—An Essential Reference Book

It is rare to see a book by one author which, like this one,* attempts to cover its subject in such a wide and comprehensive manner. It deals with "unmanufactured" fats such as margarine and cooking fats. But of the latter there is so much to say about the raw materials, their processing and their manufacture that, as might be expected, these subjects take up by far the greater part of the book.

The introductory chapter of about 60 pages is sufficient to give both a general survey of fats which are consumed by man, and a reasonable adequate account of butter, ghee and similar products. The remaining 325 pages or so deal mostly with margarine, cooking fats, shortenings and similar products. First is described the history of these products, as regards both manufacture and consumption. Then there is a good section on the sources of the fats used. The chapter on processing is an excellent one, giving in a simple form descriptions of the various stages in preparing the fats, and of the various ways in which such stages may be carried out. After dealing with some of the theoretical aspects which are important in manufacture, the author describes the detailed processes of the manufacture. There are also chapters on the industrial use of manufactured fat, on packaging and on dietary and legal aspects. There are some excellent photographs and diagrams, and some very useful tables.

There are a few criticisms which one must make of such an ambitious project, though it is on the whole so well carried out. One is the inadequate index for a book packed so full of detailed information. It is irritating to find, for example, one entry for groundnut, simply listing fourteen different pages, with no indication as to which might give the information you seek. Yet the book is so exhaustive that the information is almost certainly there.

The other errors are small but some are of importance. It is not true to say that margarine does not contain the higher unsaturated fatty acids. With the present intense interest in the causes of coronary disease, and the possible rôle of deficiency of these acids, the fact that margarine has in fact more of these acids than butter may be of immense practical importance. Nor is it true to say that margarine contains no vitamin E, or to imply that British margarine contains less vitamin A than butter.

It is only because this book will prove an essential reference work for all who are interested in edible fats that these defects are serious. It remains, however, a very good and exhaustive study.

There is no other book which covers anything like the same ground.

JOHN YUDKIN.

* *Margarine and other Food Fats.* By M. K. Schwitzer, M.I.Chem.E. Leonard Hill (Books), Limited, 9, Eden Street, London, N.W.1. 1956. Pp. 385. 46s. 3d.

▶Because of the current interest in clean air and atmospheric pollution the Sturtevant Engineering Co. Ltd., have published "Dust-Characteristics, Problems and Control" (Publication No. 2004). The 71-page booklet is divided into three sections, two of which discuss the problems of atmospheric pollution and dust hazards in industry while the third describes the characteristics of Sturtevant's filters and separators and their suitability for various situations.

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▶In its recently published pamphlet, "Why Not Work Study?" the British Productivity Council summarises for the uninitiated what work study is—a compound of work measurement and method study—how it is applied, and how snags sometimes associated with its introduction can be avoided. Appendices deal briefly with the available literature, instructional films, training facilities and the work of the B.P.C. work study unit. Copies, price 9d., can be obtained from the Council, 21, Tothill Street, London, S.W.1.

Contaminated Flour—The Pontadawe Case

By R. E. Weston, B.Sc., F.R.I.C.

(Department of the Government Chemist)

A serious outbreak of food poisoning occurred earlier this year in the Welsh township of Pontadawe when 59 people became ill after eating bread made from contaminated flour. Here is an account of the detection, isolation and estimation of "Endrin" insecticide with which the flour was contaminated. The remarkable feature of this case is that the flour picked up endrin from the floor of a railway wagon in which a consignment of this insecticide had been carried two months before.

IT IS unusual nowadays for food supplies to be chemically contaminated to such an extent as to cause serious poisoning in the community. This year the township of Pontadawe, Glamorgan, was unfortunate in providing such an example, when 59 persons required medical treatment and many others suffered from milder symptoms of poisoning. The symptoms ranged from dizziness, nausea, and weakness, to epileptiform convulsions and unconsciousness in acute cases. The local Public Health Authorities acted promptly and their enquiries quickly enabled them to trace the source of the contamination to bread and flour from one local bakery. With this knowledge, police and radio warnings were issued and it is a tribute to the authorities concerned that the outbreak was prevented from reaching more serious proportions. Brief reference has already been made to this occurrence in FOOD MANUFACTURE (August, 1956, *p.* 351) and a complete account has been recorded by Davies and Lewis,[1,2] elsewhere.

When local enquiries had failed to reveal the nature of the causal agent, the Welsh Board of Health sought the co-operation of the Ministry of Health and samples of the flour and bread were referred to the Department of the Government Chemist, London. Ten samples were received including one which possessed a faint but definite benzenoid odour and attention was initially directed to this sample.

The sample, some 400 g., was spread out for superficial examination and small discoloured patches were noted. It was all transferred to a plansifter and the residue after sieving consisted of small yellow-brown lumps. These lumps were soft aggregates of flour particles but no attempt was made to break them up. They were extracted with light petroleum and a 19% crystalline extract was obtained. This was purified by recrystallisation and examination of the resulting colourless crystals gave the following results:

Melting point ..	228°C.
Elements ..	Nitrogen, sulphur, phosphorus absent, chlorine present.
Chlorine content	55%.

These crystals appeared stable to various chemical reagents and exhaustive treatment with aqueous and alcoholic alkalies revealed no labile halogen.

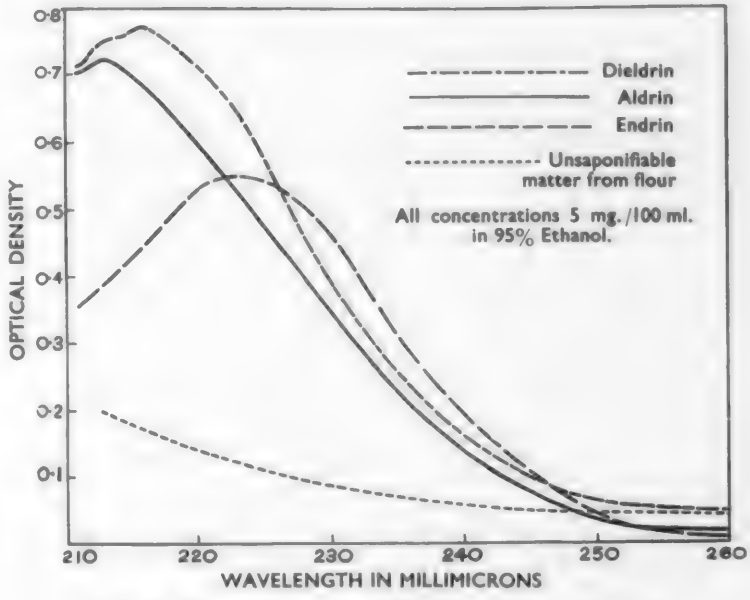

Fig. 1. Ultra-violet spectra of dieldrin, aldrin and endrin.

The evidence gained was insufficient to narrow the field very much, but since the substance could be one of the chlorinated chemicals used in agriculture, a search of the reference data[3] was made. The insecticide, "Endrin," was one listed substance with which the isolated crystals conformed as far as the published characteristics were available. A sample of a commercial emulsifiable concentrate of endrin was therefore obtained, and from it a sample of crystalline endrin was isolated. The extract from the flour and the commercial endrin were found to be identical by chlorine content, mixed melting-point, paper and partition chromatography, and infra-red spectroscopy.[4]

Thus the flour contaminant was

shown to be endrin (hexachloro-epoxyoctahydrodimethanonaphthalene).

Attention was now directed to the remaining samples and the quantitative estimation of endrin in them.

Solvent extraction furnished extracts containing much fatty matter. This was separated by saponification, and the endrin recovered from the unsaponifiable portion. That endrin was recovered quantitatively under these conditions was verified experimentally by adding a known weight (0·2%) to flour and carrying out the separation outlined.

The ultra-violet spectrum of endrin was found to exhibit an absorption maximum at 223 mμ and a value of 107 for $E^{1\%}_{1\,cm.}$ at this wavelength for a solution in 95% ethanol. This provided a convenient means of detection and estimation of endrin as it was found that no major interference was contributed by the unsaponifiable matter from flour over the spectral range 210-260 mμ. The endrin content could be checked by infra-red spectroscopy and the total halogen content.

Observations were also made on the ultra-violet spectra of aldrin and dieldrin (substances closely related to endrin) and maxima were noted at 213 and 216 mμ respectively. (*See* Fig. 1.)

Seven samples of flour were received for examination, and of these, three were found to contain endrin with contents of 0·02, 0·11, and 0·55%. A portion of bread from a loaf known to have caused poisoning was shown to have a content of 0·015% (150 p.p.m.). Scrapings from the bakehouse floor and sacking cut from the most contaminated sack revealed contents of 0·96 and 0·15% respectively.

From this evidence and other enquiries, it was inferred that some of the sacks had been contaminated in transport from the mill to the bakery. The railway wagon number had been noted at the time of loading and British Railways made arrangements for this wagon to be traced and inspected. The floor of this wagon was divided into sections and the surface of each section was wire brushed. The sweepings were collected for analysis. The sweepings from one section were found to contain 11·6% endrin and some wheat starch. Further enquiries revealed that this railway wagon conveyed a consignment of endrin concentrate over two months before the transport of flour and that at the time one container was noted to have leaked.

It is noteworthy that foodstuffs can be seriously contaminated in this way in transit, and shows that leakage from containers may have grave consequences. On this occasion it was fortunate that a sufficient quantity was available after isolation to permit identification, and to use specific properties to estimate traces in only slightly contaminated foodstuffs. This occurrence emphasises the care which should be exercised in the transport and handling of such products and the desirability of making known as widely as possible the means by which these substances can be detected and determined.

Acknowledgement: The author wishes to acknowledge the co-operation of his colleagues in carrying out certain analytical techniques and to thank the Government Chemist, Dr. G. M. Bennett, F.R.S., *for permission to publish this paper.*

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▶In their latest price list of flavour specialities for the sugar confectionery trades, Söflor Ltd. draw attention to the quantity of flavour recommended for use and to the types of confectionery for which it has been prepared. They emphasise, that while dosages may have to be varied to meet individual requirements, the amounts stated can generally be used as a guide to gauge production detail.

Recovering Waste Whisky

Recommendations on the purification of whisky distillery wastes were made at the 1956 Institute of Sewage Purification conference by C. J. Jackson of the Distillers Co. Ltd.

In this industry effluents can very rarely be discharged direct to local authority sewers and even when this is possible there is usually not enough space to treat the wastes before discharge.

Where no toxic materials are present distillery wastes can be treated to local requirements by removing solids and reducing the capacity of the effluent to absorb oxygen as determined by the B.O.D. test.

The organic substances in the effluents oxidise easily and decompose under anærobic conditions. Tests are being made to discover if the activated sludge process has an application for the weaker washes such as spent lees and steep water.

Reducing the costs of treatment so that they will not have too high an effect on production costs is the main problem. Thus the recovery of by-products from malt and grain whisky is very important and goes far towards covering treatment charges.

New methods of filtration

Purification at whisky distilleries is effected either by percolating filters or by evaporation, the latter method being used in the larger distilleries where the output is greater than 3,000 proof gal. per week. New methods of operating percolating filters, in particular on recirculation and alternating double filtration, are being investigated and may achieve considerable savings in capital and operating costs.

Evaporation is the most economical and practical method for use in grain distilleries and is standard practice in America. The pollution load can be reduced to some extent by removing insoluble solids by mechanical separation or chemical precipitation.

The Browning of Oatcakes

By H. F. Martin

(*The Cereals Research Station, The Research Association of British Flour Millers*)

Recently a manufacturer of oatcakes complained that some deliveries of oatmeal produced oatcakes having an undesirable bright orange-brown colour, whereas the normal colour is pale brown. This coloration is not caused by burning or scorching, although it is more prevalent at high hotplate temperatures. Research revealed that the normal pale brown colour is due to the natural pigment in the pericarp of the groats, whereas the bright orange colour is the result of a hydrolytic reaction involving a heat labile substance, probably enzymic, located in the germ of the groat. The pericarp is not involved in this reaction.

THERE are many different types of chemical reactions which lead to the production of undesirable brown coloration during the preparation of foodstuffs, especially during the heat treatment stages when even slight initial discolorations are enhanced by heat and become a major defect in the product.

These browning reactions have been extensively studied, and the chemical basis for the most common (the interaction of reducing sugars and amino compounds) was first proposed by Maillard[1] in 1912.

Since then much work has been published and reviewed, and a recent and comprehensive work was published by Hodge[2] in 1953 in which he gives three broad types of browning reactions: carbonyl amino reactions, caramelisation, and oxidative reactions which may or may not be enzyme catalysed.

The latter type was dealt with in considerable detail by Joslyn and Ponting[3] (1951), although in relation to fruit products only. However, Berliner[4] (1949) mentioned the formation of a brown coloured compound in wheat bran by the action of the enzyme tyrosinase on tyrosin in the presence of air. More recent work done by Shewan[5] (1955) on fish and Wager[6] (1955) on potatoes has shown that metals are involved in the formation of some of these undesirable coloured compounds.

Thus, of the many possible causes of the orange-brown colour of the complaint oatcakes it was decided to investigate first the amounts of sugars and amino compounds and then enzymic and non-enzymic oxidation effects and also possible metal contamination.

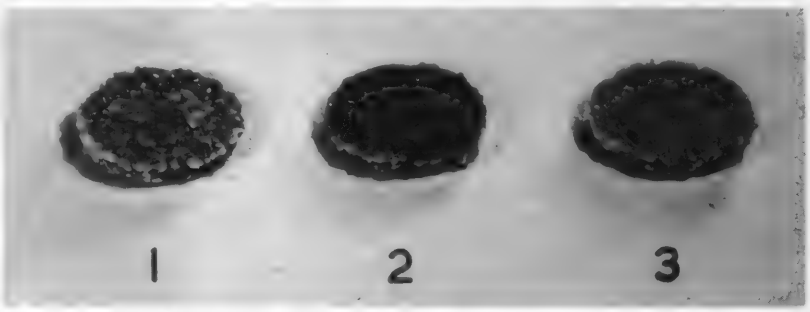

Fig. 1. Oatcakes baked in the laboratory from normal oatmeal (1), from the complaint meal (2), and from the latter after inactivation of the enzymes by heat treatment (3).

Authenticity of coloration and method of making test oatcakes

Before attempting to solve the problem it was first necessary to ensure that the browning was not due merely to scorching through excessive hotplate temperature or duration of heating, and that the phenomenon could be reproduced in the laboratory.

Various laboratory drying ovens were tested, and the most useful of those available was a rotary shelf enclosed type.

Dough was made from a mixture of 120 g. of oatmeal and 60 g. of water, and was rolled out to a thickness of 3/16 in. Circular oatcakes 1 in. in diameter were cut from the sheet dough and were baked for 20 min. at various temperatures from 125°C. to 200°C.

The appearance of oatcakes made from samples of normal and complaint oatmeal under the above conditions is recorded in Table 1.

Table 1. Relationship between Browning and Oven Temperatures

Oven Temperatures	*Colour of oatcakes made from*	
	Normal oatmeal	Complaint oatmeal
125°	Pale brown	Pale brown
150°	,,	,,
175°	,,	Brown
200°	,,	Deep orange brown

The maximum difference in colour between oatcakes from normal and complaint was revealed in those baked at 200°C., and this temperature was chosen for all future work.

Further tests, in which the oatcakes were cooked in a steamy atmosphere (achieved by having a tin of water in the oven) revealed an even greater differential in colour between the normal and complaint oatcakes.

The method of testing was subsequently modified when oatcakes of 11/16 in. in diameter and 1/16 in. in thickness were made from individual mixes of 0·6 g. of oatmeal and 0·33 g. of water. These

micro-size oatcakes were "rested" for 30 min. in small air-tight bottles (which assisted the development of the orange-brown colour) before baking for 7½ min. at 200°C. in a Gallenkamp oven fitted with an air circulating fan and containing a beaker of water to produce a steamy atmosphere.

Table 2. Analysis of Oatcakes for Sugars and Nitrogen

		Sugars		
		Reducing %	*Sucrose* %	*Nitrogen* %
Oatcakes—Complaint		0·44	3·13	1·91
Normal (1)		0·17	3·54	1·91
(2)		0·39	3·60	—
Oatmeals—Complaint		0·71	1·02	2·04
Normal...		0·35	0·93	2·11
Further 10 samples of oatmeal from complaint mill.	MAX.	0·71	1·61	
	MIN.	0·41	0·92	
	MEAN	0·52	1·30	
6 of the above ten samples.	MAX.			2·22
	MIN.			2·01
	MEAN			2·14

Table 3. Analysis of Oatmeals for Lipase Activity, Fat Content, and Free Fatty Acid Content of the Fat

Samples	*Lipase Activity** (Average raw groats) = 100% %	*Fat in oatmeal* %	*F.F.A. in fat* %
Complaint oatmeal	40	8·7	81
Normal oatmeal	2·5	7·0	26

* Measurement by the method of Hutchinson and Martin (1952).

Analysis of oatmeal and oatcakes

Samples of the complaint and normal oatmeals and oatcakes were analysed for reducing sugars, sucrose and nitrogen (as a measure of amino compounds).

It is seen from the results in Table 2 that the nitrogen content of both normal and complaint samples of oatmeal and oatcakes were almost identical; however, the amount of reducing sugar in the normal oatmeal was only half that of the complaint sample.

Analysis of a further 10 samples of oatmeal from the complaint mill (all of which produced orange-brown coloured oatcakes) revealed reducing sugar contents of 0·41% to 0·71%; the nitrogen content for 6 of the 10 samples had a range of only 0·21%. It will be noted that the sample with the lowest reducing sugar (0·41%) is similar in this respect to the original normal oatmeal which had 0·35%, but this produced a normal brown coloured oatcake.

Also the reducing sugar content of the normal oatcakes "1" and "2" was 0·17% and 0·39% as compared with 0·44% of the complaint oatcake.

Hence it is unlikely with these variations within the range of normal oatcakes and similarity in other cases with the complaint samples that the browning reaction is due to interaction of reducing sugars and amino compounds. Finally, from the sucrose content of the normal and complaint oatmeals and oatcakes it is also unlikely that the browning is due to caramelisation.

Possible enzymic browning reaction

It is known that in many oatmeal mills that there is no steam treatment of the grain prior to the kilning process. The steam treatment can completely inactivate the enzymes—including lipase—but kilning is a heat treatment by which it is difficult to achieve complete inactivation of all enzymes in oats.

Hence in oatmeal mills using kilning as the only heat treatment, the resulting oatmeal is always enzyme active to some extent. Thus there appeared to be a considerable possibility that the browning of oatcakes was due to an enzymic reaction.

Measurement of enzyme activity.—The lipase activity was used as an arbitrary measure of enzyme activity in the oatmeal concerned. The fat content and the free fatty acid content of the fat were also determined and the results are given in Table 3.

It is seen from these results that the complaint oatmeal was high in lipase activity and consequently the activity of other enzymes could be expected to be high also. The free fatty acid content of the fat (due to lipase activity) was extremely excessive in the complaint oatmeal.

Effect of high F.F.A. content of oatmeal fat on oatcake browning.—Before attempting further investigation of enzymic reactions as a cause of browning, it was decided in view of the considerable difference in amounts of F.F.A. in the two oatmeals to see whether F.F.A. alone was the cause of the browning.

Both the complaint and normal samples of oatmeal were thoroughly defatted by solvent extraction using petroleum ether of B.Pt. 40°-60°. The two defatted oatmeals were each divided into three equal fractions. One fraction of each oatmeal was retained fat free; to the second fraction its own fat was added back (proportionately); to the remaining fraction fat from the other oatmeal was added. Oatcakes were baked from these six oatmeals under conditions previously described, together with oatcakes made from untreated complaint and normal oatmeals as controls.

The tests were carried out in triplicate on three separate days, and the results in all 9 tests showed that the orange-brown coloration occurred in all oatcakes made with the complaint whether containing complaint or normal fat.

On the other hand, only normal browning of a dull pale brown colour occurred in the oatcakes made from normal oatmeal containing fat from either normal or complaint oatmeal.

The complaint defatted oatmeal (*i.e.* without addition of any oat fat) also produced orange-brown oatcakes, but the colour of these was much less intense than that of the "plus fat" oatcakes.

Hence the active principle causing the coloration was inherent in the non-fat fraction of the oatmeal, but the fat when present has an intensifying action. Furthermore, varying or excessive amounts of F.F.A. due to lipase activity do not cause browning in oatcakes although other active enzymes may be responsible for the phenomenon.

Total inactivation of enzymes in oatmeal.—The complaint sample of oatmeal was heated in a sealed tube for 30 min. at 100°C. This treatment was more than sufficient to inactivate lipase and probably enough to inactivate most of the other enzymes present.

Oatcakes were then baked under the standard conditions, using oatmeal from the normal, the complaint and the heat-treated complaint samples.

The results revealed that the heat-treated complaint sample of oatmeal produced a normal coloured oatcake identical with the oatcake baked from the "normal" oatmeal (see Fig. 1). This experiment was repeated after having reduced the three oatmeals to a common particle size. Again the results confirmed the previous finding.

Sample and varietal effects on oatcake browning.—The authenticity of the browning reaction as a general phenomenon in all enzymically active oatmeals was investigated in 10 samples comprising six samples of commercial oatmeal milled at the mill that produced the original complaint sample, and four oatmeals milled in the laboratory from Victory, Ayr Commando, Sun II and S.172 oats respectively. Each sample was divided into two fractions and one fraction of each sample was heat-treated as previously described. Oatcakes were then made from the 20 samples under the standard conditions. Excessive browning of an orange-brown colour occurred in all the untreated (enzymically active) samples, but all the heat-treated samples produced oatcakes which were almost identical in colour—a pale brown, devoid of the orange tinge.

Location of browning substances

Groats were prepared by hand shelling from a sample of Sun II oats and sub-samples of the groats were treated in various ways (see Table 4) before milling using a Wiley mill (1 mm. screen) and baking into oatcakes using the modified method. The half groats were obtained by cutting (by hand with safety razor blades) groats cross sectionally into germ end halves and beard end halves.

The germ was removed by hand dissection under a binocular microscope; pericarp was removed partially by a mechanical wet brushing method as described by Martin and Peers[8] (1953), and the removal of pericarp from the crease of the groat was completed by hand dissection. Enzyme inactivation for these samples was achieved by treating the unmilled material with live steam at 100°C. for 5 min.

Experiments 1 and 1a confirmed the previous results that the browning reaction involves a heat labile component, probably an enzyme.

If the reaction is enzymic, involving at least two components—enzyme and substrate—then experiments 2-3a inclusive show that both the enzyme and the substrate lie within the germ half of the groat, and also that at least one component is missing from the beard end halves.

Experiment 4-6a inclusive show that the germ itself contains at least one component of the orange-brown coloration phenomenon, and that the pericarp does not contain a component of this reaction at all.

However, the pericarp containing natural brown pigments, unaffected by heat, is responsible for the dull pale brown coloration.

From experiments 7 and 8 it is seen that the germ contains at least one component of the orange-brown colour reaction, and that this germ component is heat labile.

The substrate for this reaction may or may not be contained in the germ, and possibly is in the remaining part of the groat other than the pericarp.

No account of the complete reaction can as yet be given: locating the other components and identifying the germ compound must remain for future research.

However, the oatmeal miller from whom the complaint originated and several others have now solved their problem by installing steamers to inactivate enzymes in oats prior to kilning. Others who had already a steam process operating, now ensure that sufficient steam is used so that all batches of oatmeal are completely enzyme inactive.

Table 4. Experiments in the Location of the Browning Reacting Substances

Expt. No.	Composition of sample prior to milling and baking into oatcakes	Colour of oatcake
1	Whole groats (unsteamed)	Bright orange brown.
1a	Whole groats, steamed	Dull pale brown.
2	Germ end halves of groats (unsteamed) ...	Bright orange brown, very intense.
2a	Germ end halves of groats, steamed ...	Dull pale brown.
3	Beard end halves of groats (unsteamed) ...	Dull pale brown.
3a	Beard end halves of groats, steamed ...	Dull pale brown.
4	Groats with pericarp and germ removed (unsteamed)	Pale cream.
5	Groats with germ removed (unsteamed) ...	Dull pale brown.
5a	Groats with germ removed, steamed ...	Dull pale brown.
6	Groats with pericarp removed (unsteamed)	Bright orange.
6a	Groats with pericarp removed, steamed ...	Pale cream.
7	Unsteamed groats, germ removed and then steamed germ added back	Dull pale brown.
8	Germ removed, groat residue steamed and raw germ added back	Bright orange brown.

Acknowledgment.—This work is part of a programme of research being carried out for the Oatmeal Millers of England and Scotland.

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EMULSIFIERS—Control by a "Permitted List"

Control by permitted list, the method already proposed for food antioxidants and colours, is recommended for emulsifying and stabilising agents by the Preservatives Sub-Committee of the Food Standards Committee. The report* is summarised below. Objections or other representations arising from the report must be lodged at the Ministry of Agriculture, Fisheries and Food before November 30.

THE WIDE range of emulsifying and stabilising agents submitted for use in food was considered by the Sub-Committee in the light of evidence as to the value of each substance in food processing. Several of them are natural constituents of certain foods or are already common ingredients of food apart from their possible use as emulsifying or stabilising agents. The Sub-Committee decided that the use of such substances need not be regulated. The remaining substances were examined by the Sub-Committee's pharmacology panel in the light of the available pharmacological evidence. They were grouped according to chemical composition and classified as follows.

Class A. Substances for which the available biological data indicate that their use in foods in the amounts customarily employed does not appear to present a health hazard.

Class B(i). Substances which, judged on their chemical formulation, do not seem likely to present a health hazard if used in food but in respect of which the biological data, though consistent, are not sufficiently comprehensive to justify their classification as "A."

Class B(ii). Substances which must at present be regarded with some suspicion either because the biological data are inadequate or conflicting or because the precise chemical composition is not known with certainty.

Class C. Substances the biological data relating to which, or the chemical formulation of which, indicate that their use in food is likely to present a health hazard.

The substances were grouped as follows:

Group I—esters of (*a*) alcohols, (*b*) glycols, (*c*) glycerol, (*d*) pentaerythritol, (*e*) hexitol, (*f*) polyglycols, (*g*) polyglycerol. Polymerised oils.

Group II—cellulose derivatives.

By far the most widely used substances are the partial fatty acid esters of glycerol—the "superglycerinated fats"—which on digestion are split into glycerol and fatty acid in the same way as ordinary fats (triglycerides). There would seem to be no reason to be suspicious of these esters as a class.

It appears that, with the exception of propylene glycol, the toxicity of the glycols renders them unsuitable for use in foods. The toxicity of the polyglycols tends to decrease with increase in the mean molecular weight. The polyol moiety of the fatty acid esters is stated not to be metabolised. No information has been submitted on the metabolic fate of the polyglycerol esters. The cellulose ethers and derivatives are metabolically inert, and pass through the digestive system unchanged.

The case for a permitted list

The general view is that chemical food additives are not in the public interest unless there is adequate evidence that they will not affect adversely the health of the consumer and unless a strong case can be made out that their use in food would have advantages for the consumer.

All the substances dealt with in the report have value as processing aids or to improve palatability or to impart a particular texture to food; without them it would be impossible to make many composite foods and soft drinks in the form to which the public have grown accustomed. Many of the substances present no health hazard in the small quantities normally consumed. On the other hand, there are others which are not wholly free from suspicion and, until conclusive favourable evidence becomes available, should not be permitted. The Sub-Committee considers that the number of substances used in foods for the purposes coming within the scope of the report should be controlled and that control can best be exercised by prescribing a list of permitted substances.

The use of emulsifying agents in bread requires special consideration, and the Sub-Committee re-

THE PERMITTED LIST

super-glycerinated fats
synthetic lecithin
propyleneglycol alginate
propyleneglycol stearate
methyl cellulose
methyl ethyl cellulose
sodium carboxymethyl cellulose
stearyl tartrate
diacetyl tartaric acid esters of super-glycerinated fats
monostearin sodium sulphoacetate
sorbitan esters of fatty acids

Provision should be made for other substances to be permitted in substitution for, or in addition to, those already on the permitted list states the Sub-Committee.

commends that only super-glycerinated fats and stearyl tartrate should be permitted. Super-glycerinated fats closely resemble natural products. The pharmacological evidence indicates that stearyl tartrate is free from health hazard.

Emulsifying agents should not be added to milk for sale as such, but there is no objection to the practice of using certain of them as processing aids in the manufacture of evaporated milk, milk powder and other dairy products.

The prohibition on the use of thickening agents in cream should be continued, and should apply to reconstituted cream and to any other foods where the use of emulsifying agents might mislead the public by making a food appear of better quality than it actually is.

No limits are specified as to the amount of emulsifying agent to be used in any food but the amount used should always be the smallest quantity practicable.

Specifications of composition and purity

It is recommended that, in consultation with the interests concerned, specifications of composition and purity should be drawn up for the emulsifying agents on the permitted list.

The provision of special labelling restrictions is not considered necessary. There is no objection to the existing provision of the Labelling of Food Order that sodium citrate, sodium phosphates and sodium tartrate may be designated as "emulsifying salts" without further specification when used singly or in admixture as ingredients of food.

When emulsifying agents are sold, the chemical nature of the product and an indication that it is of the necessary purity for use in food should be given. Descriptions implying that the substances are substitutes for fat or eggs should not be permitted.

Brominated oils, polymerised oils and silicone products were not classified as emulsifiers or stabilisers. There is no objection to the continued use of brominated edible vegetable oils in soft drinks and flavouring compounds used in the preparation of soft drinks.

Of the two silicone products which have been represented as being used in the food industry, one, a methylpolysiloxane, is used to suppress undesirable foaming in certain food manufacturing processes, and the other, a silicone resin—methylphenylpolysiloxane—is used in the baking industry in place of a greasing agent. It is heat-cured on to the baking tin forming a semi-permanent glaze which obviates the need for repeated tin-greasing.

There is no objection to the use of either product, though a limit of 10 p.p.m. should be imposed in the case of the silicone antifoam agent.

Before deciding what action should be taken on the Sub-Committee's recommendations, the Ministers concerned will consider any representations from interested parties. They should be sent to the Assistant Secretary, Food Standards and Hygiene Division, Ministry of Agriculture, Fisheries and Food, Great Westminster House, Horseferry Road, London, S.W.1, to arrive not later than November 30, 1956.

* Food Standards Committee report on Emulsifying and Stabilising Agents, H.M.S.O., 1956, 9d.

THE DAYS OF RATIONING

WAR reminiscences have a nostalgic attraction for many people, but the story of the Ministry of Food's wartime activities (in three volumes) can hardly hope to become a best-seller.

The second volume* in this series has just been published, and one feels inclined to agree with Sir Henry French (who was secretary to the Ministry of Food from 1939-45) when, in his review of the book in *The Times*, he questioned the purpose of a war history of this magnitude and character. A third world war would produce conditions vastly different from those of the last, and it seems unlikely that a future Ministry of Food will obtain much help from this history, Sir Henry averred.

The second volume of Mr. Hammond's conscientious history of wartime food control consists of a number of detailed monographs, falling into three groups. The first comprises four studies in the control of commodities—fish, milk, eggs and potatoes—that were wholly or mainly home-produced, did not have to pass through a manufacturing process on the way to the consumer and could not therefore be strictly controlled through Ministry of Food ownership. They are studies, therefore, in commodity regulation through the medium of statutory rules and orders.

The second group of studies is concerned with the organisation of the "emergency services" which included arrangements for supplying bread and milk to bombed cities, the feeding of air raid victims and the establishment of hundreds of iron ration dumps.

The third and longest part of the volume is devoted to the administrative problem of consumer rationing. The whole rationing machinery was one of the most complicated administrative problems this country has even seen. One food—tea—was found incapable of conforming to the traditional British rationing system, and had to be dealt with on completely different lines.

A third volume, dealing with the principal imported foodstuffs, is being prepared.

* *History of the Second World War. Food. Volume II. Studies in Administration and Control.* By R. J. Hammond. 1956. H.M.S.O. Pp. xiii+835 incl. index. 50s. net.

Wine Production in California

By W. V. Cruess, Ph.D.

(*Department of Food Technology, University of California*)

California makes 90% of the output of wine in the United States, and in recent years production has usually exceeded 100 million gal. p.a., about two-thirds being dessert wines and the rest table wines. Dr. Cruess has been intimately concerned with the industry for many years and here he describes production techniques from the picking of the grapes to bottling the finished wines. The range of products includes red and white table wines, muscatel, port, angelica, sherry and champagne.

WINE PRODUCTION began in California when the pioneering Spanish Franciscan priests brought vine cuttings and grape seeds from Mexico and established culture of the grape and wine production at the California Missions late in the 18th and early in the 19th centuries. At least one grape variety introduced by them—Mission—is still grown in California. The Franciscan "padres" used the wines on the table and for sacramental purposes chiefly; although small amounts were sold.

After the American Civil War grape growing and wine making expanded greatly in California, during the period 1870 - 1890. Many grape varieties were imported from Europe and tested in the several grape-growing areas of the State.

In 1918 the 18th Amendment to the U.S. Constitution was adopted and remained in force until 1933 when it was repealed. Commercial wine making was prohibited during that period, although much wine was made in homes for family use and some illicit wine was made and sold illegally. The present Californian industry dates from that year, that is, 1933.

Grape recovery station at a large winery.

Production

In recent years production has usually exceeded 100 million gal. per year. Production of typical pre-prohibition years and since repeal are given in Table 1.

California wines are of two main classes, namely, (1) table wines or dry wines of 11 to 13% alcohol content and (2) dessert or fortified wines of about 19 to 21% (usually 20%) alcohol content. Such wines as Claret, Burgundy, Cabernet, Riesling, White Pinot, Semillon, Chasselas, and so-called Dry Sauterne are examples of dry wines, and such wines as Port, Muscatel, Sherry and Angelica represent the dessert wine class. At present more than two-thirds of California wine production consists of dessert wines. Ordinarily, dessert or fortified wines are considered to be designed for use as aperitifs or appetisers as is sherry, for example, or for serving after the meal with the dessert, as are muscatel or port. However, much of the dessert wine is used in place of, or as a substitute for "hard liquor" (whisky, gin, brandy), because the customer can buy more alcohol in the form of dessert wine for a dollar than he can buy in the form of distilled liquors. Another favourable condition is that the dessert wines have an alcohol content (20%) about equal to that of a cocktail; and hence possess a very pronounced "kick."

Wine producing areas

The three principal areas in which wine grapes are produced in California are the Coast counties area, the great interior Valley area and the Southern California area. The Coastal area of Napa, Sono-

Table 1. Production of Dry and Dessert (fortified) Wines in California

Year	Table Wines (dry wines) gallons	Dessert Wines gallons	Total Gallons
1909-1913 average	24,434,000	19,161,000	43,950,000
1933 ...	19,627,000	35,679,000	55,306,000
1935 ...	11,677,000	54,013,000	65,690,000
1940 ...	21,810,000	79,008,000	100,818,000
1945 ...	33,617,000	82,717,000	116,334,000
1946 ...	49,970,000	127,664,000	177,634,000
1950 ...	24,280,000	100,673,000	124,952,000
1954 ...	31,182,000	87,625,000	118,807,000

ma, Santa Clara, Alameda, Mendocino and Contra Costa counties is noted for its dry table wines, which are often of fine quality, comparable to that of the dry red wines of Burgundy, Bordeaux and Northern Italy and the dry white wines of the Rhine and of France.

The great interior Valley area, chiefly in the San Joaquin Valley, produces both dry table wines and dessert wines but much more of the latter than of the former. The Southern California region, near and east of Los Angeles, produces both table and dessert wines in comparable quantities. In point of total production the interior Valley region produces much more wine than the combined output of the other two regions. Its dry table wines and those of Southern California are usually rated somewhat lower in general quality than those of the Coastal counties because the grapes grown in the hot summer climate of the interior Valleys are of less desirable composition for making table wines. On the other hand because of their high sugar content and lower acidity they are ideal for making dessert wines.

Wines are also produced in several states in the Eastern section of the U.S.A., notably in New York and Ohio; although California produces more than 90% of the American total output. In the Pacific Northwest States of Oregon and Washington, considerable wine is made from blackberries, boysenberries and currants.

Grape varieties

In California the so-called European varieties of grapes are used for wine; being known otherwise as Vitis vinifera varieties. Most of these are found in the wine districts of France and Italy and the fine white grape varieties used in California for Riesling and other Rhine-type wines are the same as those used in Germany.

The Cabernet sauvignon of Bordeaux is grown in limited amount and used to produce a fine Bordeaux-type red wine of deep colour and rich flavour. The Pinot noir is used for a fine Burgundy-

Old style roller crusher and stemmer.

type wine as it is in France. The Zinfandel is a variety apparently unknown in Europe. It makes a red wine of berry-like flavour and of medium red colour. It is the most important red wine grape in point of total production. The Carignane of France is also grown extensively for red table wine as is the Petite sirah and also the Alicante bouschet. Smaller amounts of Mataro, Barbera, Salvador and Gamay are grown; and among the white varieties the Johannesbuger Riesling, Grey Riesling, Semillon, Traminer, Sylvaner and Pinot blanc are fine table wine varieties.

End view of Garolla crusher and stemmer.

The Thompson seedless, Burger, and Palomino are often used for making common white wines. The Muscat, a white variety grown for raisin production, is also used to make Muscatel, a popular sweet dessert wine. The best California sherries are made from the Palomino variety which, incidentally, is the variety used in Jerez de la Frontera, Spain, for sherry making.

In other states the Vitis vinifera varieties ("European varieties") are not grown. In those states varieties of the Vitis la brusca species, all native American varieties, are used for wine making and include the Concord, Delaware, Isabella, Norton and several others. They have a pronounced "wild grape" flavour, sometimes called "la brusca" or "foxy flavour" and are usually of relatively high total acidity.

Picking the grapes

For table wines the grapes should be picked when their juice tests 21-23° Brix or Balling and for dessert wines at 23-28° Brix. The bunches are cut from the vines by a knife with a short curved blade and the grapes are placed in "lug boxes" holding about 50 lb. each.

For fine table wines the grapes are transported to the winery by truck in the lug boxes; for "bulk" table wines (*vin ordinaire*) they are usually emptied into large gondola-type trucks and hauled in bulk to the winery, where the truck body is tilted and emptied into a conveyor much as a load of gravel is dumped.

Crushing and stemming

Until a few years ago the grapes were crushed in the old-style French crusher which consisted of two fluted metal rolls revolving towards each other. The crushed grapes and stems dropped into a horizontal sheet-metal cylinder with circular openings about 1·5 in. in diameter. Rapidly revolving paddles "batted" the crushed grapes through the openings and "kicked" the stems out of the end of the cylinder.

Most wineries now use the Garolla-type crusher now made in

California but formerly imported from Italy. The grapes are fed into a hopper by conveyor and then fall into a large horizontal cylinder, usually about 30 in. in diameter and about 8-10 ft. long. It contains slots about 0·5 × 1·5 in. in the feed end and circular openings of about 1·5 in. diameter in the main part of the cylinder. The cylinder revolves rather slowly, about 25 r.p.m. Paddles inside the cylinder revolve at about 500 r.p.m. The combined effects of the revolving cylinder and paddles results in thorough crushing of the grapes and separation of the two. The crushed grapes fall into a sump beneath the crusher.

The crushed grapes from either type of crusher are pumped to the fermenting room by special pump, the modern pump usually being a semi-displacement-type centrifugal pump of cast bronze with manganese bronze impeller. In one large winery the pump is operated by a 40 h.p. 1,800 r.p.m. electric motor with a multiple V-belt drive and is connected to a 6-in. copper pipeline to the fermenting room. It will pump up to 185 tons of crushed grapes per hr.

The crushed grapes or the juice drained or pressed from them are both known as "must."

Most wineries discard the stems. However, they contain 7 to 8% of fermentable sugar. Therefore, in some of the larger wineries they are shredded, water is added and they are fermented. The fermented stems are then distilled to give high-proof brandy used in fortifying dessert wines.

Use of SO_2

Early in the history of wine making in California, fermentation was allowed to proceed without attempt to inhibit the growth and activity of undesirable yeasts and spoilage bacteria. Consequently, much lactic sour and other wine of unsound condition was made. In the meantime the use of SO_2 in fermentation and during ageing in order to inhibit wild yeasts and prevent bacterial spoilage had come into general use in European wine-making regions, notably in Germany and France.

About 1900, largely through the research and publications of the University of California, this means of control of fermentation and prevention of bacterial spoilage was introduced in California. By the time of adoption of the Prohibition Amendment in 1918 the use of SO_2 and bisulphites had become common practice with consequent very beneficial effect on the quality and soundness of California wines.

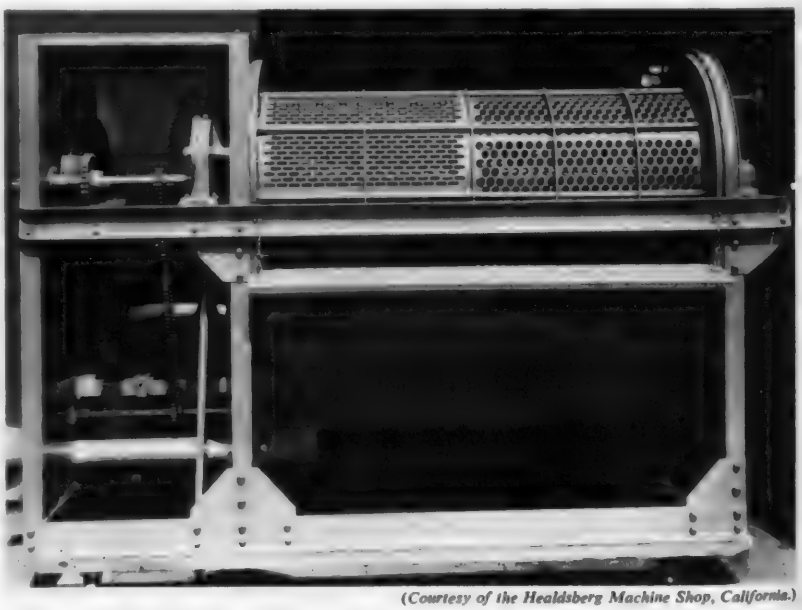
SO_2 is now generally added to the crushed grapes as the vat is being filled. In the larger plants gaseous SO_2 is added from a cylinder of the liquefied gas by introducing it into the crushed mass by means of a small hose or stainless steel pipe. The cylinder of SO_2 rests on a scale so that the gas can be measured by weight. In many plants a measured volume of a solution of sodium bisulphite or potassium metabisulphite of known strength is added. In either case the SO_2 or sulphite and must are thoroughly mixed by draining off and pumping the juice over the crushed grapes or in small wineries by "punching" the crushed grapes manually.

The usual amount of SO_2 added before fermentation is 100 to 150 p.p.m., or if bisulphite or other salt of SO_2 is used an amount that will give this range of SO_2 on reaction with the organic acids of the must is used.

The SO_2 exerts a selective action on micro-organisms; it inhibits or kills wine spoilage bacteria and most wild yeasts, but in the concentrations used has little effect on the true wine yeast, *Saccharomyces ellipsoideus*, which is responsible for the alcoholic fermentation of the must.

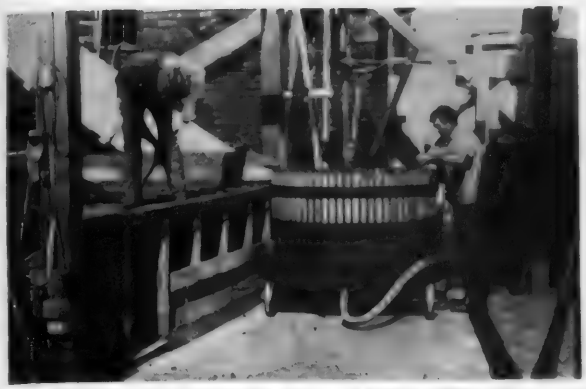
Fermentation vats and tanks

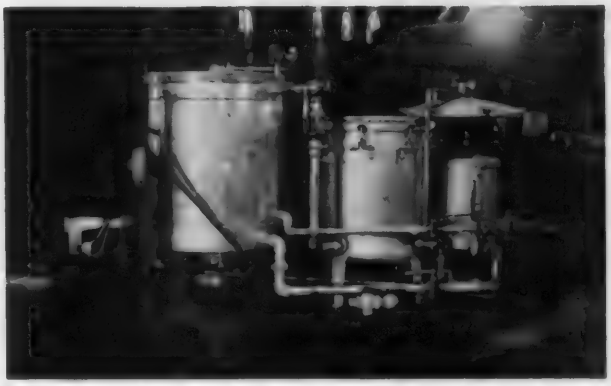
In making red wines the crushed grapes are usually fermented in open, circular, redwood vats of 1,000 to 10,000 gal. capacity or in open, large, rectangular, concrete vats. In several of the largest wineries very large (30,000 to 60,000 gal.) concrete tanks are used closed, that is, except for a large manhole in the cover. White musts are fermented free of the skins, stems and seeds in wooden or concrete tanks with openings in the cover for escape of CO_2 gas during fermentation. Oak ovals of 500 to 3,000 gal. capacity are also used for white fermentation. These closed tanks are also used later for storage and ageing of the wine.



(Courtesy of the Healdsberg Machine Shop, California.)

Garolla type grape crusher and stemmer. After Cruess, "Commercial Fruit and Vegetable Products."





(*Left*) **Basket type hydraulic press.** (*Right*) **Wine filter equipped with fine stainless steel filter screens. Infusorial earth is used as filter aid.**

Pumps

For transferring crushed grapes a large-bore plunger pump, or a special centrifugal pump of the type previously mentioned is used. For handling juices or wine as in racking, or in filtering, cooling, pasteurising, or for other purposes, centrifugal pumps are generally used. Some of these are stationary, as at the crusher, others are portable, for use at various points in the winery. They are of stainless steel or bronze.

Filters

These are usually of the following types:

(1) plate and frame filters of aluminium alloy or stainless steel, using special chain-weave cotton filter cloth between the frames,

(2) filters in which a fine screen of stainless steel, on which a layer of infusorial earth is built up are also in common use, and

(3) for polishing the wine, rendering it sparkling clear, one of several makes of asbestos pad, or fibre pad, plate and frame filter is used.

All metal surfaces in contact with the wine should be of stainless steel or aluminium, or other corrosion-resistant material. Traces of iron or copper dissolved by the wine from pumps, filters, pipelines, etc., cause clouding of the bottled, finished wines.

Pasteurisers

In the production of dry bulk or common wines (*vin ordinaire*) and of dessert wines it is customary to flash pasteurise the young wines in order to stabilise them against clouding after ageing and bottling. The pasteurisers are usually of the well-known A.P.V. stainless steel, hollow-plate type made in America by Walker Wallace Co. In England, where this pasteuriser originated, it is used for pasteurising milk and fruit juices. In some plants, however, the older, jacketed-tube form of pasteuriser is used.

Wine pasteurisers are equipped also with water-jacketed cooling plates or tubes so that the wine may be flash heated and then flash cooled to room temperature.

Pressing

In making white wines the "free run" juice is drained from the crushed grapes and the residual solids are pressed; in making red wines the crushed grapes are first fermented, then drained of free run and pressed.

White grapes for dry wines are usually pressed in basket presses of the type used in France, which are operated by hydraulic pressure from a powerful pump. This press is also used for pressing fermented red wine grapes in some of the smaller wineries; but in the larger plants these grapes are pressed in a continuous screw-press in which a powerful horizontally placed screw inside a heavy perforated cylinder operates against an adjustable cone at the outlet of the press, which regulates the pressure. At the Roma winery in Fresno, California, are presses of this type operated by 25-h.p. motors through synchrogear reduction. A press with 13-in. diameter screw handles the pomace from 40-50 tons of grapes per hr. and the 16-in. 50-70 tons per hr.

The press wine or press juice is stored separately from the free run, or in dessert wineries is used for distillation to produce brandy.

Fining

In some cases the wine, especially dry red table wine, will become very clear as a result of settling and racking during ageing so that a final polishing filtration before bottling is all that is required. But usually the wine requires "fining," which consists of adding a substance or two of them that coagulate in the wine, gathering in the suspended, finely divided colloids and settling out to give a brilliantly clear wine.

The more important fining agents are gelatin, gelatin plus tannin, casein and Wyoming bentonite. Gelatin of highest quality is dissolved in warm water and an amount determined by laboratory-scale fining tests is added to red wine slowly during pumping over to thoroughly mix the wine and gelatin. The natural tannin of the red wine precipitates the gelatin to form a coagulum that settles out. Also the gelatin "mellows" the red wine flavour by reducing its tannin content. If the wine is white, high-quality tannin is added before adding the gelatin, as white wines are very low in tannin content. The amount required is determined by laboratory-scale tests on 100 to 200 c.c. portions of wine.

Casein is sometimes used, especially for white wines that have darkened during ageing, as it exerts a rather marked action in removal of excess colour. The water-soluble potassium or sodium caseinate, free from off-flavour and/or odour, is dissolved in water to give a 1 to 2% solution which is used in fining.

The most common fining agent, however, is bentonite clay, a tasteless, montmorillonite clay of unusual swelling power and mined in the State of Wyoming. It has been used in the clarification of honey and was first applied in clarifying wine by L. G. Saywell, of the University of California, in 1934. It is very easy to use. In Spain a similar clay is used for clarifying sherry wine and is known there as "tierra de Lebrija" or "clay from Lebrija." It is less pure than Wyoming bentonite and appears to be chiefly a montmorillonite. Bentonite is furnished in powder or fine granule forms.

One method of using the bentonite is to mix a weighed amount with a measured volume of wine to give an approximately 5% suspension or thin "mud" which should be allowed to stand with occasional stirring for 24 hr., or longer before use in fining, in order to give the clay an opportunity to disperse and form a colloidal slurry.

The circulation pump is started and as the wine is drawn off from the bottom of the tank the bentonite slurry is added slowly and the wine circulated until the fining agent and wine are well mixed. Other fining agents are added in a similar manner.

The wine is allowed to settle until the finings sediment is compact and the wine is clear. Hull, *et al.* (1951) state that 7 to 8 days' settling is usually sufficient in the Roma winery in California for wine clarified with bentonite. Gelatin may require longer.

The settled wine is then drawn off (racked) from the sediment and filtered. Bentonite fining is applied early in the ageing of dessert wines; often within two or three weeks or sooner after fortification.

Gelatin and casein finings are more often used in the aged wine than in the new. Bentonite is used at the rate of 1 to 3 lb. per 1,000 gal. for wines that are reasonably clear and as much as 5 to 10 lb. per 1,000 gal. in very new, very cloudy dessert wines. Much less of gelatin or casein is used normally, less than 1 lb. per 1,000 gal.

Racking

New dry wines are allowed to settle for about a month or less in closed, completely filled, redwood or concrete tanks after fermentation is complete and are then "racked," drawn off, from the yeast-lees or sediment and transferred to another tank for ageing. During ageing the wine is racked at least twice a year to aid in clearing and to promote ageing.

Dessert wines are racked as soon as they have "settled" after fortification; that is usually within two to three weeks. They are often clarified, also, immediately after the first racking (see section on "fining"). Racking is accomplished by pumping the wine from one tank to another.

Refrigeration

In Switzerland or Germany the winter temperatures are sufficiently low to chill the new wines to the point at which excess cream of tartar crystallises out. If not removed in this manner it would deposit in the bottle later to give an unattractive sediment.

In California it is customary to artificially chill the wine for a sufficient period to allow crystallisation of the cream of tartar, as our winter temperatures are not low enough to bring about rapid crystallisation of excess cream of tartar (potassium bitartrate).

The preferred procedure is to chill new dry wines to 24-25°F. and dessert wines to 14-16°F. by passage through the tubes of a direct *Freon* or NH_3 (ammonia) cooled refrigerating machine and to store the chilled wine for two to four weeks in tanks in a cold room maintained at 32-25°F. In some plants the tanks are in a room at ordinary room temperature and the wine re-cooled periodically during the detartration period. In this system the tanks are covered with a thick layer of insulating material.

Fortification

Dessert wines also, known as "sweet wines," are "fortified"—that is, high-proof brandy is added to the new wines to bring the alcohol content to above 18% and below 21%. The alcohol content of the wines at time of bottling is usually about 20% by volume (c.c. of alcohol per 100 c.c. of wine).

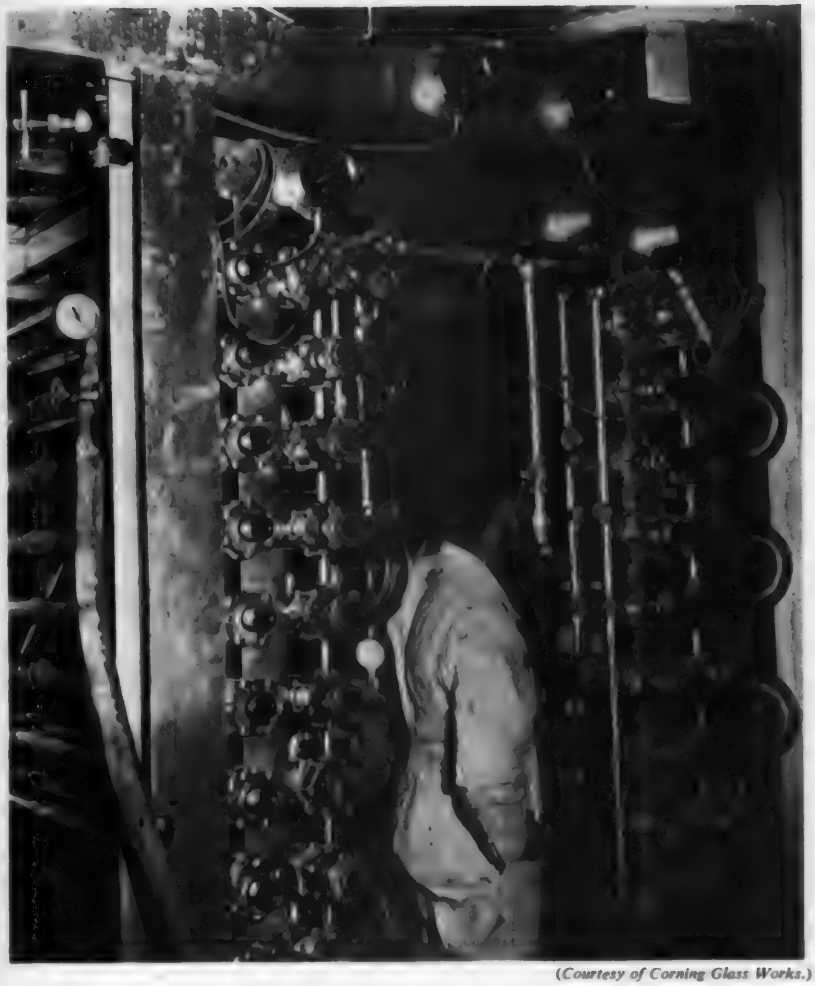
The brandy used is usually of 180 proof (American proof), that is, of 90% alcohol content by volume, and is quite neutral in character, that is, low in amyl alcohol, acid, ester, and aldehyde content.

It is usually new, being produced during the current season or vintage. It is colourless.

Fortification is conducted in a separate room, set aside in accordance with Federal regulations for that purpose, and must be done by, or under, the direct supervision of an agent of the United States Alcohol Tax Unit, that is, a U.S. gauger, who is stationed at the winery for the duration of the vintage. He analyses the new wine and calculates how much brandy is needed to fortify the given lot of wine and then weighs out that quantity of brandy of known alcohol content. It is then added to the new wine and the mixture is pumped over, or mechanically stirred, or aerated, to give thorough mixing. It is then analysed and transferred by pump to the ageing cellar.

Ageing and stabilisation

Fine dry table wines are aged in small redwood tanks, or oak ovals, or in 180-gal. oak puncheons, and common table wines and dessert wines in larger redwood tanks, or large concrete tanks, the latter coated inside with microcrystalline wax. During ageing the wine undergoes certain favourable changes in flavour and bouquet. Slow oxidation by O_2 picked up during



(*Courtesy of Corning Glass Works.*)

Pasteuriser and cooler of shock-resistant glass. After Cruess "Commercial Fruit and Vegetable Products."

racking, fining and filtration is responsible for some of the change as is also esterification and precipitation of cream of tartar, and of some protein, etc.

During the ageing of dry wines the tanks must be completely filled and tightly sealed to prevent acetification. Because of their high alcohol content, dessert wines may be stored in partly filled tanks.

The American market demands a brilliantly clear wine that will so remain even if stored several days in a refrigerator or subjected to rather high summer temperatures in the home or sales room. It is rendered stable by refrigeration of the new wine and if necessary by flash pasteurisation. These treatments are described in previous paragraphs.

Common table wines are often aged less than one year, fine red table wines about three years and common dessert wines six months to a year for the bulk market. Fine sherries are aged for several years, as is also fine Muscatel and Port.

Dry white wines of fine quality develop best if bottled at about one year of age and then aged for two years or longer in the bottle.

Heavy metals in wine

Dissolved copper in white wines causes haziness after bottling; as little as 0·5 p.p.m. of copper will cause this defect. Iron may cause a greenish haze or precipitate. Tin may cause haziness. For these reasons metal equipment in contact with wine should be stainless steel, aluminium alloy, or other corrosion-resistant metal.

Heavy metals can be removed by addition of a small amount of potassium ferrocyanide, a method discovered and used in Germany. The amount of ferrocyanide required must be determined by laboratory test. The State and Federal agencies concerned with wine regulations do not favour the use of ferrocyanide and require that any wine offered for sale be completely free of it; a requirement that does not absolutely prohibit its use. If properly used no ferrocyanide remains in the wine.

Joslyn, Lukton and Cane, of our department (1953), have reported upon their very thorough study of removal of heavy metals from wine by many different compounds, including ferrocyanide. Among the substances investigated, other than ferrocyanide, rubeanic acid was the most promising.

Red table wine

The production of the more important types of wines will now be briefly considered.

The "flow sheet" for dry red table wine is about as follows:

The grapes are crushed, stemmed and pumped to the fermentation vats; 100-150 p.p.m. of SO_2 is added and "mixed in"; several hours later a starter of very actively fermenting must (juice) containing per c.c. many millions of cells of a selected wine yeast, such as Burgundy, Champagne Ay, or Tokay, is added; the whole is pumped over to mix the yeast and must several times daily and to prevent acetification in the cap (layer) of skins, seeds and stems that forms at the surface and to aid in colour extraction. The juice is tested several times daily with a Balling or Brix hydrometer to follow the course of fermentation. As sugar is fermented the Balling (Brix) degree decreases.

The temperature rises due to the heat of fermentation, making it necessary to draw off and cool the fermenting juice at least once during fermentation, returning it to the vat. For fine wines the temperatures should be kept below 70°F., and, for common wines, below 85°F., as flavour and bouquet are damaged by high temperatures, and at very high

temperatures, 95-105°F., the activity of the yeast is injured. Fermentation on the skins extracts necessary tannin and colour.

When the must reaches 0 to 2° Balling or Brix the free run is drawn off and the pomace is pressed. The press wine and free run fine wines are aged separately as the press wine is apt to be harsh.

It is racked in late November or early December and several times a year during ageing. The new wine is usually fined with bentonite. It is refrigerated and may be flash pasteurised for stabilisation. It is aged 2-4 years and bottled. It should be aged in the bottle for 6 months or longer before sale.

Bulk red wines are usually aged a shorter time; often less than a year, and are always refrigerated and often pasteurised for stability. They may be aerated by frequent rackings to hasten ageing. They may be bottled at the winery but very often are shipped by tank car to cities of the Midwest and Eastern U.S.A. for bottling near point of sale.

Some dry red wine is made by first making a red juice by extraction of the colour by heating the crushed grapes and fermenting the juice free of skins.

Vats of juice in fermentation.

White table wine

Operations are similar to those for dry red wine, except that the juice is not fermented on the skins. A flow sheet for common white wine might be as follows: Crush, stem, add SO_2, drain off free-run into tank, add yeast starter, ferment in a covered tank, cooling as needed, settle, rack, refrigerate, rack, filter or fine, flash pasteurise, filter, age, polish filter, and bottle or ship in bulk. For fine white wine pasteurisation is usually omitted.

Muscatel

For this wine, ripe Muscat grapes of 23-28° Balling are crushed and stemmed; SO_2 added, fermented on the skins to approximately one-half the original Balling; free-run drawn off and fortified to 20% alcohol; settled; racked; fined with bentonite; settled; racked; filtered; refrigerated; flash pasteurised; filtered; aged; filtered; bottled. Or the crushed grapes are drained to give free-run juice out of which muscatel is made as above.

The residual skins, seeds and stems in either case are mixed with an equal amount of water, allowed to ferment dry, free run drawn off, pomace pressed and the resulting "distilling material" of about 6% alcohol content is distilled for making 180 proof brandy used in fortification.

The finished wine is usually about "20 × 8"—that is, of 20% alcohol content and 8° Balling, but may range from 6 to 8 Balling. It is sweet.

Port

Procedure is similar to that outlined for Muscatel. However, it is customary in some plants to extract the needed red colour by heating the juice and mixing it with the crushed grapes and allowing to stand until the desired colour is obtained: 120°F. being a temperature often used. In one plant the grapes are hammermilled to give a thin purée which is flash heated to about 190°F. to extract colour and is then flash cooled to room temperature. This "purée" is partially fermented, free run drawn off and fortified, and the residual mass drained, diluted, fermented and distilled.

Port is usually about "20 × 6," 20% alcohol and 6° Balling; that is, it is quite sweet.

Angelica

This is a white dessert wine made from white grapes other than Muscat. It is much less flavourful than Muscat. It is often used for blending with Muscatel, Sherry and Port to attain any desired sugar content.

Sherry

By the usual California procedure a dry or nearly dry white wine is first made. This is fortified to about 20% alcohol; settled; racked; fined with bentonite; filtered; refrigerated; and then "baked" for several months. Baking consists of heating the wine in large (20,000 to 30,000 gal. or larger) wooden tanks, or in very large (up to 60,000 gal.) concrete tanks. The baking temperature is usually in the range of 120-140°F., and the baking period 2 to 3 months. A pale dry sherry may be baked at 110°F., or merely aged out in oak, without any baking whatsoever. The finest pale dry sherries are not baked.

The sherry is usually sweetened

slightly with Angelica or grape concentrate for dry sherry and to a greater degree for other sherries.

Several California wineries now produce some sherry by the Spanish method or process in which the unfortified wine of 15-15½% alcohol content is inoculated with Spanish sherry film yeast (flor yeast) and aged for at least three years in butts or barrels with the flor yeast, which develops as a heavy, wrinkled, white film on the wine. It is then fortified, aged in oak and is then blended with pale dry baked sherry to improve the flavour of the latter.

Occasionally baked sherry is treated with a small amount of decolourising carbon in order to produce a pale dry sherry; the best sherries are not so treated.

Champagne

Some fine champagne is made by the re-fermentation of aged, fine dry wines in bottles, much as is done in France. Also, larger amounts are made by re-fermentation in closed, stainless steel tanks by the Charmat process of France. The fermentation is rapid, completed in two or three weeks. The wine is filtered and bottled under CO_2 pressure. It is then aged for several months in the bottle. As in France, the Charmat procedure gives a good but usually not fine champagne, that sells for a much lower price than that fermented in the bottle.

In both procedures a small amount of cane or invert syrup and a starter of champagne yeast are added to the wine. Fermentation ensues, with generation of about 75-80 lb. pressure of CO_2 gas.

Laboratory control

All of the larger wineries maintain well-equipped laboratories staffed with well-trained personnel. All wines in storage are analysed frequently (dry wines once a month, dessert less frequently) so that the condition of the wine is known at all times. Volatile acidity is taken as the measure of soundness. If it rises unduly rapidly in a dry wine it is an indication that bacteria, usually lactic, are at work. The laboratory staff also makes clarification tests, determines heavy metal content of the wines, looks after pure yeast production and fortifications and co-operates closely with the superintendent and cellar staff in many ways.

Smaller wineries may have a laboratory and chemist also, or may have a commercial chemist analyse their wines at regular intervals.

Wine Institute and Wine Advisory Board

The wineries of the State have a trade organisation known as the Wine Institute, with headquarters at 717 Market Street, San Francisco. Its staff consists of a manager, secretary, board of directors and several office workers. It also maintains a representative in Washington, D.C., to look after tax problems, leglislation, tariff questions, etc. It promotes research on wines and exchange of technical information through its Technical Advisory Committee, composed of the chemists, engineers, and others from the member wineries and wine-research persons from the University of California. In addition it operates through a considerable number of committees made up for the most part of wine producers. A small assessment on each gallon of wine produced provides the finances.

The Wine Advisory Board is a separate agency whose principal function is to promote sale and use of wine.

Instruction and research

The University of California provides instruction in viticulture and wine making in its College of Agriculture at Davis, California. Formerly instruction in enology (the science of wine making) was also given in the Food Technology Department of the University, in Berkeley, California, but since transfer of that department to Davis, all instruction in wines is given there. Graduates of these courses now man the laboratories in wineries throughout the State. Research is conducted in the department of Viticulture and Enology and in that of Food Technology at both Davis and Berkeley.

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Carotene in Canned Fruits

MANGO, papaya and jack-fruit are common fruits in India and a study has been made of the effect of canning on their β-carotene contents by G. S. Siddappa and B. S. Bhatia (*J. Sci. Industr. Res.* (*India*), 1956, **15C** (5), 118).

Among mangoes, Badam and Raspuri varieties are rich sources of β-carotene containing 6,060 and 4,730 μg. of β-carotene respectively per 100 g. of fruit pulp. Among papayas, the yellow-fleshed fruit has nearly 773 μg. while the red-fleshed has only 294 μg. of β-carotene per 100 g. of pulp. Jack-fruit contains about 240 μg. of β-carotene per 100 g.

At the end of three weeks' storage at 25°-30°C., there was practically no loss in the β-carotene content in canned Badam and Raspuri mangoes. In canned papaya and papaya butter after 12 months' storage at 25°-30°C., the retention of β-carotene was 52% and 64% respectively. In canned jack-fruit, after 6 months' storage under similar conditions, the retention was 97%. Almost the whole of the carotene was in the drained fruit in all cases.

Canned mango pulp, canned papaya butter, and Badam mango powder, which contain 1,400-2,100 μg. of β-carotene per 100 g. are useful sources of β-carotene.

Fully Automatic Tunnel Pasteuriser

By John Grindrod, B.A.

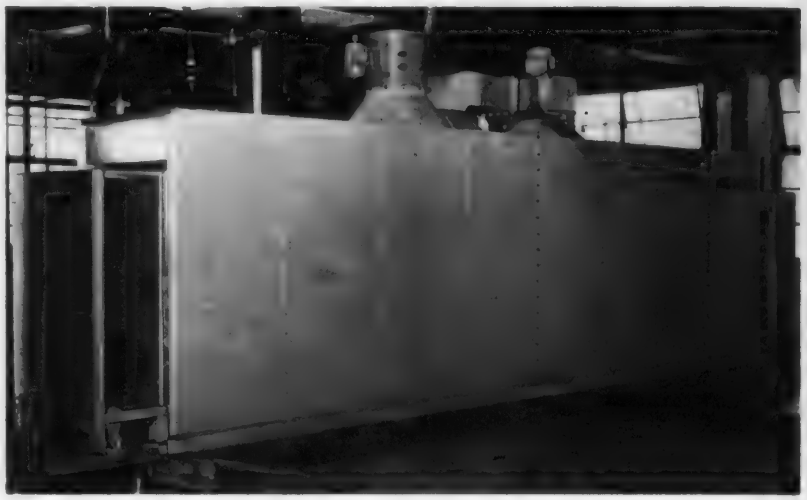
Preheating, pasteurising and cooling is done in one sequence in a new type of plant developed in Holland, an outstanding feature of which is low steam consumption.

INCORPORATING a number of interesting features a new type continuous pasteurising plant, operating on the tunnel principle, in which preheating, pasteurising and cooling is done in one operation, has been developed by the Dutch firm N.V. Bronswerk, of Amersfoort. It claims amply to fulfil the six fundamental requirements for efficient pasteurisation, viz. reliability, low power consumption, continuous processing, simplicity of operation, minimum of bottle breakage and low initial cost. It is suitable for treating milk, fruit preserves, fruit juices, jams, preserved vegetables, tinned meat and fish, beer, vinegar, etc.

In setting out to produce a new type of pasteurising plant, N.V. Bronswerk worked on the assumption that existing methods failed to satisfy the full requirements called for. For instance, they claim that the old water bath method suffers from the drawback of high steam consumption and is a lengthy process. Pasteurisation by means of autoclaves is comparable with the water-bath system, though the autoclave will, in addition, lend itself to sterilisation at temperatures in excess of 100°C. by means of steam under pressure. Sterilising cabinets, also sometimes used for pasteurising, suffer from the disadvantage that, locally, bottles or jars are subject to considerable differences in temperature, due to air pockets resulting from lack of proper circulation.

From the start, therefore, Bronswerk decided upon a circulating heating medium, for which, for temperatures under 100°C., a mixture of steam and air was chosen, this mixture appearing to ensure the quickest heat transfer.

Before being passed through the new Econpast tunnel-type plant, the bottles or cans are assembled in crates on trucks which stand before the tunnel entrance. Each truck is fitted with two vertical fixed partitions. At regular intervals one truck is moved forward into the tunnel, those already in the tunnel being caused thereby to move along to the next section.



General view of the new pasteurising plant. Above the tunnel are the two fans. The steam injector pipes are on the other side of the plant.

Inside the tunnel, a number of circuits are formed by means of partitions. Through the first three circuits a mixture of steam and air is circulated. This flow is obtained by means of steam injectors fitted in the top of the tunnel and the steam/air mixture is drawn from the tunnel at one side and forced back into the tunnel at the other side.

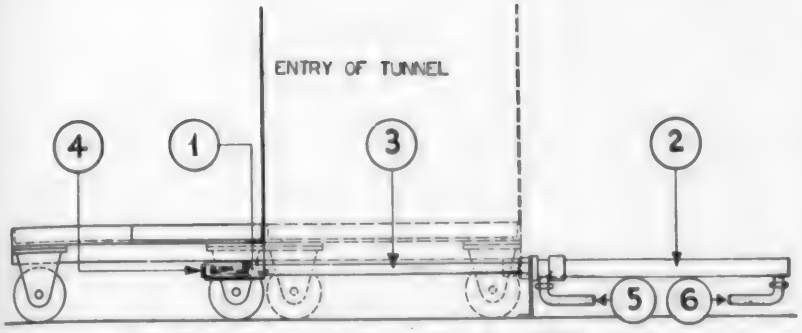
In the case of milk pasteurisation, the cold bottles are placed first in circuit I, in which a mixture of steam and air at approximately 65°C. is circulated.

When the loaded truck is moved forward in the flow sequence to circuit II the bottles are exposed to a temperature of approximately 78°C., this temperature being selected in such a way as to ensure that the bottles, on leaving circuit II will have acquired a temperature of exactly 65°C.

In circuit III, a steam/air mixture at 66°C. is kept circulating by means of a fan, a damper being adjusted in such a way as to ensure that the mixture will circulate through the four sections of this circuit. Throughout all four sections the temperature of the bottle contents is accurately maintained at 65°C.

On leaving this circuit, the bottles enter the cooling section of the tunnel. Here, they are rapidly cooled with the use of flowing water. In the first cooling section the water is at 35°C. temperature and in the next sections at 12°C.

Should it be desired to pasteurise at a higher temperature for a relatively short time, the damper is placed in a vertical position. This causes the temperatures in circuits I and II to be raised to 75°C. and 90°C. respectively, while, in the first half of circuit III, steam of 100°C. is circulated. In the second half of circuit III, a temperature of approximately 1°C. in excess of the required pasteurising temperature is maintained by means of a fan. On leaving the pasteurising section, the bottles are cooled in three



The hydraulic system of propulsion through the tunnel.

In this system the bottom centre of the trucks is fitted with two welded-on lugs (1). Exactly in between these lugs, inside the tunnel, is a hydraulic cylinder (2). If the oil pressure of approximately 70 to 100 atm (1,000 to 1,500 lb./sq. in.) is admitted at the back (6) of the cylinder, the ram (3) is forced out and a specially designed gripper (4) will be inserted behind both lugs. If the oil pressure is admitted in the front (5), the gripper will draw the truck inside the tunnel, causing the trucks in the tunnel to move one truck length. One hydraulic stroke equals the length of one truck.

stages, first at 65°C., then at 35°C. and finally by means of cold water.

In both cases, the bottles have reached a very low temperature by the time they leave the plant, and, generally, this can be accurately controlled by choosing the correct cooling time and cooling water temperatures.

Some products such as fruit preserves, lemonades, etc., may leave the Econpast at 25°C., thus ensuring that the bottles will dry within a few minutes so that they may be labelled at once in a continuous operation.

For use in breweries, the plant is equipped for heating and cooling by means of air, which is heated with the help of heat exchangers and circulated by means of a fan. Also, using air for cooling enables the bottles to be pasteurised with labels attached.

Made of steel plate and steel sections, or stainless steel if required, the tunnel is almost steam-tight. For small capacities, when the weight of a train of trucks can be kept within certain limits, progress through the tunnel is effected by means of a geared motor, the trucks being moved forward by a cam fitted on the motor driving shaft. Larger plants have a hydraulic driving gear, the stroke of the hydraulic ram corresponding to the length of one truck.

Drive by motor, as well as hydraulic drive, may be supplied, in fully automatic design, a time switch facilitating pre-setting of the drive for any required pasteurising time.

Temperature maintenance in the pasteurising section is achieved with the help of a thermostat with solenoid motor-driven steam valve. When the requisite temperature is reached the valve closes automatically and is re-opened when the temperature shows a slight fall. In this way modulated control is provided, giving accurate adjustment within very narrow limits.

The fan in the pasteurising section is of the centrifugal type and is equipped with a vertical totally enclosed flange motor. The impeller is entirely made of aluminium in order to restrict corrosion. Practically noiseless operation is achieved.

For exhausting the vapour set free by cooling, either an exhaust fan or an injector is fitted inside the discharge channel. This fan has an air displacement large enough to ensure a maximum cooling effect on the bottles or jars.

The cooling water is circulated by means of self-priming centrifugal pumps driven by totally enclosed 3-phase motors. The atomised cooling water is sprayed over the bottles through special jets.

With the continuous steriliser or pasteuriser it is frequently possible to introduce a regenerative phase, *i.e.* when the vapour exhausted from the first cooling section is warm enough to warrant its use in the first two preheating sections. The vapour is then led into the second half of circuit I by means of a fan, the discharge duct then being fitted over the first half of circuit I. This is, however, only feasible with the use of fairly high pasteurising temperatures and with products entering the Econpast in a cold condition.

Uniform heating of the tops and bottoms of the bottles is achieved by the intensive circulation of the steam/air mixture. This has been proved over a long range of measurements using maximum thermometers.

Since the steam condenses direct on the bottles, this ensures that all the steam is utilised for heating the bottles and their contents to the required temperature. Because the temperature in circuit III is thermostatically controlled its supply will be automatically reduced when treating a smaller number of bottles.

It has been calculated that an Econpast plant with a capacity of 2,000 1-litre bottles per hr. for the pasteurising of, say, milk, at 80°C. has a steam consumption of nearly 300 kg./hr. With the use of the water-bath method, apart from this quantity, steam will also be required for heating and maintaining the water at the correct temperature. The heating of this 4,000 litres of water alone would require, it is estimated, approximately 450 kg. of steam. Even with the application of an intricate water circulation system to ensure that during cooling not all the heat will get lost, a large quantity of extra steam would be required for heating and maintaining the water at the correct temperature.

Because the operation of the plant is fully automatic, labour is required only for stacking the crates at the tunnel entrance and their removal at the discharge end. The trucks then have to be pushed back to the entry. Since, too, the heating is so uniform bottle breakage seldom occurs.

FRUIT, VEGETABLES and F.I.O.

Conditions for the gas-storage of apples and pears have been examined by the Fruit, Vegetables and Plant Products division of the Food Investigation Organisation. Work has been done on the transport of soft fruit and the efficiency of cold stores. This information is given in the F.I.O.'s recently published report which is summarised here.

FRUIT, VEGETABLES AND PLANT PRODUCTS DIVISION

Gas storage of fruit

BIOCHEMICAL studies at the Ditton Laboratory, Kent, have included work on the nitrogen metabolism of fruit, which has a bearing on storage behaviour; on the amino acid isolated from the peel of apples (believed to be methyl-hydroxy-proline), and on the analysis of apple pulp for quinic, malic and citric acids during growth. Small quantities of an acid, apparently succinic acid, have been found in apples stored in carbon dioxide concentrations (10-20%) greater than those normally recommended. This may explain the cause of carbon dioxide injury since succinic acid is toxic to apple tissues at low concentrations.

Pears are not usually stored at temperatures below 34°F. However, it has been shown that they can be stored very much longer and considerably better at 30-31°F. To do this requires a means of ensuring that temperature variation does not exceed ±1°F. The effect of storage in very low concentrations of oxygen (about 3%) at the lower temperature is being studied.

Cox's Orange Pippin apples stored in 3% of oxygen (97% nitrogen) keep better than in 6% carbon dioxide with 15% of oxygen (79% nitrogen) but not quite so long as in 5% carbon dioxide with 3% oxygen (92% nitrogen). The "6:15" mixture is that sometimes used in the present type of gas store not fitted with a scrubber, while the "5:3" mixture is the usual gas mixture in a store fitted with a scrubber. Apples from the carbon-dioxide free atmosphere are more yellow than from the conventional gas mixtures but are quite firm. If this method of storage is ultimately recommended the yellow colour would be advantageous for this variety.

It has been shown that ethylene has no stimulatory effect on respiration. It appears that it may now be possible to store different English varieties in the same store in atmospheres low in oxygen and free from carbon dioxide at temperatures of about 3°C.

Scald in apples

Chromatographic analysis of compounds which may contribute to scald in apples has been supplemented by a study of derivatives of these compounds collected from the air surrounding stored apples; *n*- and *iso*-butyraldehyde and methyl ethyl ketone have been identified among C_4 carbonyl compounds, while *d*-2-methylbutanol-1 (active-amyl alcohol) was found to be the principal C_5 alcohol produced by the varieties of apple used.

Apples held in stores to which acetone or *n*-butanol had been added had a significantly higher incidence of scald than those in an untreated store. No correlation has been found, however, between the rate of production of acetone or *n*-butanol and the incidence of scald during the seasons in which analyses have been made on fruit stored in a normal manner. This suggests that these simpler compounds, though not directly causing scald, may act as precursors of scald-inducing substances. The physiological effects of compounds of higher molecular weight are being tested.

Oiled tissue paper wraps which are used to prevent scald in stored apples are being examined in an attempt to identify the less volatile compounds which they absorb and certain fractions have been located which only occur in the used wraps. A group of carbonyl compounds from these fractions is being investigated.

Lenticel rotting

Studies on the effect of cultural conditions on lenticel rotting of apples indicate that spraying in the orchard may reduce the extent of infection. New methods of modifying storage conditions to delay the onset of rotting in storage cannot be recommended yet.

Soft fruit transport

An experimental insulated container with a metal lining has been successfully used to transport commercial consignments of pre-cooled strawberries, raspberries and cherries in 20-25% carbon dioxide from Kent to Manchester and Aberdeen, and raspberries from Perth to Liverpool and London.

The mobile experimental refrigerated store was used for pre-cooling and bulk-storage trials of prime plums. These tests confirmed that while pre-cooling did not noticeably affect the condition of fruit picked when near-ripe, wastage by fungal rotting was reduced. Pre-cooling was most beneficial when the load was protected by a closed container with the minimum of ventilation. When the plums were stored continuously at 1°C., there was very little fungal rotting. When storage was prolonged, however, the development of rots after the fruit was moved to stores at ordinary temperatures was more rapid than that in freshly picked fruit. Some low temperature injury of the "jellying" type was found. This developed mainly after removal of the fruit from store and did not affect the market value of the plums. Though storage in 5%

oxygen without carbon dioxide gave some improvement, this method cannot be recommended for commercial practice yet.

Rotting of strawberries

An investigation was undertaken to determine the organisms responsible for the rotting of strawberries. The rotting was caused by *Mucor piriformis* and by *Botrytis cinerea*; the inclusion of berries with even slight rots appreciably raised the Howard mould count of a sample. High mould counts were also found with fruit infected with the powdery mildew *Sphærotheca humuli*, which does not cause rotting.

Gas storage of peas

Peas in the pod were stored at 0°C. (32°F.) under conditions which allowed the accumulation of 5, 10 and 15% carbon dioxide. Damage and off-flavours were caused by storage in 15% carbon dioxide after 6 to 7 days, and storage in 10% carbon dioxide from 10 to 14 days. Storage in 5% carbon dioxide for 2 to 3 weeks resulted in somewhat better colour retention than storage in air and a slight delay in the onset of rotting.

Storage of potatoes

The use of nonyl alcohol as a sprout suppressant of potatoes in storage has been studied on a 16-ton scale. This alcohol is readily available in bulk and is effective at a very low concentration. Since the rate of evaporation is lower than that of amyl alcohol, a higher rate of ventilation is permissible. The cost of the treatment is low.

Work on methods of assessing potato quality and of specifying quality suitable for different user's requirements is being carried out. Sugar content, at all stages, is one of the important factors in quality and quick methods of assessing sugar content are being developed. An experimental cooking unit has been set up at Ditton for this work.

Cold stores

The design and performance of cold stores is being studied, in particular the factors affecting the humidity of air cold stores and losses of weight by evaporation. Tests have shown that when ethanolamine has been used as an adsorbent in a scrubber unit its vapour does not injure fruit.

A technique has been developed for measuring *in situ* the thermal conductivity of the insulation material of cold stores by means of a "heat probe" previously calibrated against a standard fluid. The "k" values of insulation obtained by the method have been found to vary. For example, the "k" values of the cork insulation of some stores which have been in use for 25 years were 0·31 in a dry location and 0·58 where it had become damp.

GENERAL BIOCHEMISTRY AND BIOPHYSICS DIVISION

Research on fruit and vegetable tissues and products has also been carried out by the General Biochemistry and Biophysics Division. Work included studies on the phenolic constituents of plants, the texture of fruits and vegetables, the metabolism of green peas in relation to their storage and gummosis of plums.

Browning reaction in dehydrated vegetables

It has been shown previously (FOOD MANUFACTURE, 1955, **30**, 499) that some 95% of the browning reaction in dehydrated vegetables is initiated by a reaction between amino acids and sugars. However, there has been found a rather wide range in the rate of browning per unit of soluble nitrogen even when the sugar content was fairly high. The study of a group of samples has shown that the browning system was extremely sensitive to change in *p*H and also to changes in the buffer system present; that it was markedly accelerated by phosphate or arsenate and that it was retarded by sodium sulphate or chloride. It seems unlikely, therefore, that browning could be much reduced by the selection, on a basis of amino acid composition, of certain stocks of raw material as being the most suitable for dehydration.

To the Editor . . .

P.O.E.M.S.

SIR,—Have enjoyed your copy of July, 1956. Regarding your article on "bread"—in recent years I have read similar literature. Wonder why the bakers don't try flour, that venerable grain that came out of Mesopotamia?

I, meanwhile, am substituting with "hardtack" and pumpernickel, and if the chemists "improve" upon them I shall have to go to chopped straw!

L. J. SALTER,
Salter Canning Co., Inc.
North Rose, Wayne County,
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Dough Improvers Compared

RESULTS of a comparative study by C. J. Dempster *et al.* (*Cer. Chem.*, 1956, **33** (4), 221) of the effect of the addition of potassium bromate and potassium iodate to dough from four widely different flours suggest that each improver may cause a different reaction, each of which produces changes in the rheological behaviour of dough.

Optimum loaf properties produced by the use of iodate occurred at lower equivalent concentrations than when bromate was used. The improvement produced by iodate was less than that produced by bromate, which had a slower reaction in dough than did iodate. Relaxation constants for iodate-treated doughs were larger than those for the corresponding control doughs, but both decreased at similar rates with increasing time. For bromated doughs, relaxation constants for all but one flour decreased with time at first but more slowly than those for controls and this was followed by an increase in the relaxation constant. Chemical analyses showed that unleavened doughs consumed considerably more iodate than the optimum concentrations indicated by the baking test. By contrast, the concentration of bromate in unleavened doughs decreased linearly with time at a rate dependent upon flour grade.

CANNING—A NEW INDUSTRY IN NORTHERN NIGERIA

Palmoil stew, yam pottage, groundnut stew with guinea fowl, and Jollof rice with beef, are some of the specialities evolved by the new cannery in Kano, Northern Nigeria. Equipped with British machinery, and employing cans imported from the U.K., the cannery hopes eventually to turn out 10,000 cans of "Crescent" brand foods a day.

ONLY sixty years ago, in his book *Nigeria, Our Latest Protectorate*, Canon Robinson wrote, "How many . . . would . . . find difficulty . . . if asked to say in which of the five continents the town of Kano was situated." Yet, within those sixty years—in fact, within the last decade, Kano has grown from a completely medieval city of purely historic interest, to the most progressive commercial centre in Northern Nigeria, and one of the most important towns in the whole country. Furthermore, since the last war Kano, with one of the most modern airports on the Continent, has become one of the better-known towns in the world, as a principal stopping place on the air route from Europe to South Africa.

Loading packed cans into the steriliser.

Because of its geographical position, not only has Kano become important today as an airport but, hundreds of years ago was equally important as the assembly point for the camel caravans which transported the famous "Sokoto red" goatskins on the long desert journey to Morocco . . . giving to the world "Morocco leather." As the ever-expanding trade with the outside world increased, so did Kano's population, and today, with more than 127,000 inhabitants, the town has become the centre of the most densely settled province of the Northern Region. A cannery has now been started in Kano which will add to the town's importance.

Although it would be an exaggeration to say of the people of Kano (as was said of the people of a certain town in the United States famous for its canneries) that "they eat what they can, and can what they can't," at the rate of growth of this infant industry, it may be applicable in the not-too-distant future.

Financed by the Development Board of the Northern Region and in co-operation with the Department of Commerce and Industries; the Cannery was started as a pilot venture in 1951 with the

object, apart from the obvious one of producing canned foods, of utilising so far as possible local and *only* local, surplus products.

Four years of experimentation have been spent in discovering the correct proportions of ingredients. With the able co-operation of a Nigerian woman, whose help in working out recipes made it possible to produce a standardised article, such West African dishes as Palmoil Stew, Yam Pottage, Beans in palm oil with pepper and tomato sauce, Groundnut Stew with Guinea Fowl and Jollof Rice with Beef were evolved. Having produced the foodstuff, these were then canned and the cans sent to laboratories in the United Kingdom for checking. Tests established that the cans produced kept their contents fresh and pure for an indefinite period and this standard has been maintained.

Sufficient progress had been made in these experiments by 1954 to justify an approach to one of the world's largest meat-canning organisations, Liebig's Extract of Meat Co., with an invitation to participate in commercialising the venture. Another old-established trading firm, John Holt and Co. of Liverpool, was also approached, and between these two concerns and in conjunction with the Development Board of the Northern Region, the Nigerian Canning Co., Ltd., came into being.

Putting the tops on cans.

Cans, imported flat from the U.K., are rounded in the cannery by local labour.

With two such well-known trading houses—one with great technical knowledge of the canning industry and the other with a highly successful history of trading on the West Coast and both with over three-quarters of a century's experience—it is expected that by producing a high-class article at a reasonable price, *Crescent* brand foods will, within a short time, be on sale in most of the main towns of West Africa.

Having established high standards, the Nigerian Cannery takes care to maintain them. All animals are slaughtered under hygienic and humane conditions, while at the same time conforming to Mohammedan custom. Food is cooked under the close supervision of experienced men and women to ensure wholesomeness. Once cans have been filled, weighed and sealed, they are sterilised under super-heated steam pressure and stacked for observation of any defects, before packing into cartons for distribution to retailers.

Modern canning and cooking equipment was imported from the United Kingdom and installed by the Metal Box Co. Cans are imported flat, to save shipping space and freight charges, and rounded at the cannery; in this work the local labourers have quickly shown a knack in handling the machinery.

As the industry grows it is hoped to extend its scope by encouraging local farmers to grow specific crops for the exclusive use of the cannery. Apart from palm oil, which comes from the southern parts of Nigeria and is therefore an indigenous product, only two ingredients have to be imported. Unfortunately, the locally grown onions, of which there is a considerable crop grown in the north, have been found lacking in the full flavour necessary for canning, so dehydrated onions are imported from Egypt. Local tomatoes also are insufficiently rich in colour for canning, and purée is imported from Italy.

The Agricultural Department of Northern Nigeria is experimenting with several types of tomato, imported from all over the world, and hopes soon to be able to introduce a strain which will be acceptable to the cannery: seeds will then be distributed to farmers for propagation. It is hoped that arrangements for experiments with the locally grown onions will shortly be started to produce the correct type and so enable the cannery to use ingredients which will be 100% Nigerian.

Dairy Scientists Meet in Rome

By our Special Correspondent at the 14th International Dairy Congress

THE Fourteenth International Dairy Congress was held in Rome from September 24 to 28. The headquarters of the Congress was in the magnificent Food and Agricultural Organisation building in Rome. Nearly 3,000 people from all over the world attended. The meetings were organised in three main sections as follows:

Section 1.—Milk for liquid consumption

1. The collection of milk from farms and small collecting stations, having particular regard to environmental conditions, to size and accessibility of herds, transport problems, etc.

2. The planning and management of dairies processing milk for liquid consumption.

3. The distribution of liquid milk, in relation to type of milk, containers used, character of distribution area, consumer preference, etc.

4. The effect of different types of modern processing on the nutritive value of liquid milk (of various animal species).

5. Various forms of utilisation of milk and cream.

6. The assessment of the cost of producing, processing and distributing various types of milk for liquid consumption.

7. The position of milk as an article of diet in various countries, together with methods for increasing liquid milk consumption.

Section 2.—Dairy products—technical and economic problems

1. Technical problems of butter-making.

2. Various aspects of the relation of butter to other fats used for human consumption.

3. The assessment of butter production costs.

4. Technical problems of cheese making.

5. The assessment of cheese production costs.

6. Butter and cheese as articles of diet in various countries, together with methods for increasing their consumption.

Section 3. — Legislation, control, methods of analysis

1. International trade in dairy products.

2. National legislation and international conventions concerning cheese.

3. Milk legislation in various countries (results, advantages, defects, possible improvements).

4. The standardisation of methods for milk analysis.

5. The organisation of the control of quality of dairy products.

In addition there were special conferences (lectures) on the position of the milk industry in national economy, the sufficiency of the supply of milk in hot countries, and the utilisation of surplus dairy products. Individual papers were not read, but for each of the subjects in the list given above a "reporter" was appointed who summarised all the papers classified under that subject. He gave a brief synopsis of the papers and the meeting was then open for discussion.

In addition to the formal proceedings of the Congress, the organisers had arranged for a "milk village" or exhibition to be set up immediately opposite the F.A.O. building.

A large number of countries were represented at the Congress.

Britain provided the largest contingent, even larger than that of Italy itself.

Poor standard of discussions

The formal meetings of the Congress were perhaps the least valuable of all the activities which took place. There is little value in the synopses of the papers, but open discussions can be of great value and interest. However, the standard of these discussions was very low, many of those taking part using valuable time to state what has been common knowledge in dairy science and technology for many years. The papers submitted have already been published in three double volumes, and a final volume summarising lectures and discussions will be issued later. Such publication affords everybody the opportunity to study the papers in detail, and this perhaps may be considered to compensate for the relatively poor quality of the discussion meetings.

As with all international congresses, probably the most valuable feature was the opportunity for members to meet workers in their own field from all over the world. It was, however, common to hear people say that they had not been able to meet those whom they had hoped to meet, and this can, of course, be attributed to the large numbers attending the Congress, and to the fact that they were scattered in hotels all over Rome. In the future some definite arrangements might be made for people who wish to discuss specific problems to contact each other.

It is doubtful whether the more knowledgable people from the more advanced dairying countries would have learnt anything from the Congress as far as the papers and discussions at the Congress were concerned. It is probable that those from the less developed dairying countries would have obtained a large amount of useful information. However, as is now generally recognised, it is the personal contacts which constitute the most important feature of any international congress.

Finally, appreciation should be expressed to the Italian authorities for their hospitality and organisation of the Congress, and to Dr. G. Pittoni, the Secretary-General, and his staff. The receptions in the evenings afforded us an opportunity to see under very pleasant conditions some of the magnificent buildings in Rome.

It is probable that the next International Dairy Congress will be held in England in 1959.

What is a Restrictive Trade Practice?

By Lord Meston *

On November 2 the Restrictive Trades Practices Act comes into force, prohibiting the collective enforcement of conditions as to resale prices. In this article the author explains the meaning of the Act and defines the practices to which it refers.

HE WOULD be a big man who could answer the question posed in the title in every detail. And an encyclopaedia would be required to house his answers. However, the question is simpler so far as the Restrictive Trade Practices Act, 1956, is concerned, for that Statute deals with "goods" and not with "services" or the "terms of employment" of "workers." That being so, it may be useful if we examine some of the more prominent practices in the nature of *Collective Discrimination* in regard to "goods." These may be conveniently discussed under the following headings:

Collective discrimination by sellers in favour of certain buyers

The essential feature of such an agreement is that the buyers who enjoy its benefits are selected solely for their qualifications or status and incur no reciprocal obligation to discriminate in favour of those suppliers. The two main forms of discrimination are preferential prices and exclusive selling. In some trades where sellers agree to discriminate in price, they agree among themselves what the preferential terms shall be. The preference may be expressed in various ways but generally it is expressed as a percentage discount to be deducted from each seller's list price or price to users.

Sometimes the sellers go further and agree that they will sell their goods exclusively to certain favoured buyers. The latter may be identified either by definition or listing. A definition may merely distinguish between the main categories of buyers—*e.g.*, "distributors" as distinct from "users," or "wholesalers" as distinct from "retailers." But the definition may go further and, for example, exclude wholesalers who engage in any retail trade. But the majority of trades use an agreed list of names instead of relying on a definition to identify the favoured buyers. The list may be specially prepared, stating the name of each individual, or it may simply relate to the membership of a particular association. This list is embodied in an agreement, and decisions about the operation of the agreement are usually taken by the governing body of the association to which the sellers belong. Failure to secure admission to an approved list, or deletion from the list, often determines whether a person can engage in the trade he wishes to follow.

* Author, *The Secretary's Guide to the Restrictive Trade Practices Act*, 1956.

Collective discrimination by sellers in return for exclusive buying

An agreement of this type involves not only discrimination by sellers but also an undertaking by the buyers to buy only from those suppliers who are parties to the agreement. The suppliers may give some form of price concession or an undertaking to confine supplies altogether to the favoured buyers. The buyers may undertake to buy all their supplies from the suppliers who are parties to the agreement, or a proportion of their supplies from those suppliers. Where the suppliers' discrimination is in the nature of a price concession to distributors, the concession is invariably given by way of a fixed discount, usually from common prices which the manufacturers have agreed among themselves. Penalties may be imposed for breaches of the agreement, the ultimate penalty being usually the deletion of the offender's name from the list. If membership of an association carries with it the right to participate in the agreement, the offender may be expelled from the association.

Collective discrimination by buyers

This is an agreement among buyers to discriminate in favour of sellers who are selected either for their special qualifications or because in other respects their methods of trading are thought to be in the interests of the buyers who make the agreement. There may be a straightforward agreement between the parties to buy only from certain suppliers who may be either defined or listed. Sometimes the agreement among the buyers is expressed as an agreement not to buy from certain sellers or not to buy certain specified classes of goods or goods produced or supplied in a certain way.

Exclusive buying agreements are usually administered by the trade association to which the buyers belong. The method of enforcing the agreement against sellers is generally by means of a buyers' boycott.

Aggregated rebates

This is an agreement among suppliers to pay their customers rebates calculated at rates which vary according to the total value of the individual customer's purchases from members of the group. Aggregated rebates are in effect a special form of discrimination in favour of large buyers. The amount of rebate earned by any customer is calculated from that cus-

tomer's total purchases from members of the group during a given period. Sometimes a sliding scale is used. That is to say, the rate of rebate rises step by step with the individual's total purchases, generally up to a given maximum. Sometimes, instead of a sliding scale, there is simply a fixed rate for purchases over a specified minimum, with no rebate payable on purchases below that figure. The rebate is usually paid in the form of a lump sum at the end of a quarter or half year, or, more frequently, at the end of a year. In a number of trades the rebate is paid not as a lump sum at the end of a period but as a discount from current prices.

Collective agreements to adopt and enforce conditions of sale

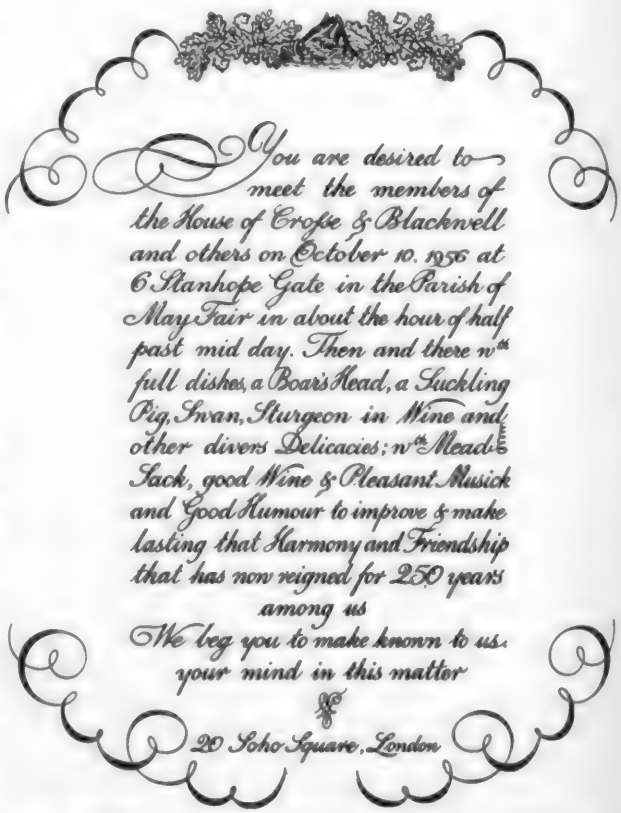
These agreements deal with general trading rules and may also contain provisions relating to resale price maintenance. Under these agreements the sellers undertake to fix resale prices for some or all of their goods, or to attach to their goods other conditions of sale which restrict competition among those who resell them. Many trade associations have adopted a wide range of trading rules designed to prevent concealed forms of price-cutting. It is, however, specially in the field of *resale* price maintenance that the most stringent action is taken. Groups of traders, acting as such or as members of a definite trade association, employ several methods for the *collective* enforcement of trading rules or conditions of sale. One of these methods is an agreement which has the effect of obliging suppliers to withhold supplies from persons whose names are published in a "stop-list" for failing to conform to the trading rules adopted by the group. Another method is the agreement which has the effect of obliging sellers to sell, or to sell at trade terms, only to buyers who have indicated that they will abide by the rules. In such cases supplies are usually confined to an "approved list" of buyers who have given a general undertaking to maintain resale prices and to abide by any other trading rules.

Associations adopting the "stop-list" procedure generally publish what is called a "protected list" of the articles to which their arrangements apply. These are usually proprietary branded articles. All the members of the association are required by the rules to withhold supplies either of the goods on the protected list or, in some cases, of all goods covered by the association, from any person named in the stop list.

The other common method of enforcement above mentioned, namely, the procedure of the "approved list," is to confine supplies, or supplies on trade or preferential terms, to persons who have indicated that they will abide by the rules. For breach of the rules the offender's name may be removed from the approved list.

There are other types of sanctions which are sometimes imposed for breach of the rules of general trading or for the offence of "price-cutting." These are withdrawal of membership from the trade association, either for a limited period of time or permanently. The latter is a most serious sanction and may mean the virtual extinction of the trader's business. Sometimes a fine is imposed instead of any other punishment. Not infrequently these sanctions are imposed by domestic courts—generally known as "private courts"—established by the trade association to deal with offences against the rules.

As from November 2, 1956, the Restrictive Trade Practices Act, 1956, renders unlawful the *collective* enforcement of conditions as to resale prices. That is to say, it shall be unlawful for two or more persons carrying on business in the United Kingdom as suppliers of goods to make any agreement for enforcing (*e.g.*, by withholding supplies) any condition as to the price at which goods may be resold. And any agreement authorising the recovery of penalties (however described) from dealers who resell goods in breach of any such condition is rendered unlawful; and so is the conduct of any domestic proceedings (*e.g.*, "private courts") in connection with recovery of such penalties. But the Act specifically recognises the right of the individual supplier—as distinct from two or more suppliers acting collectively—to enforce conditions as to the resale price of his products in the ordinary Civil Courts in this country.


You are desired to
meet the members of
the House of Crosse & Blackwell
and others on October 10. 1956 at
6 Stanhope Gate in the Parish of
May Fair in about the hour of half
past mid day. Then and there w^ch
full dishes, a Boar's Head, a Suckling
Pig, Swan, Sturgeon in Wine and
other divers Delicacies; w^th Mead &
Sack, good Wine & Pleasant Musick
and Good Humour to improve & make
lasting that Harmony and Friendship
that has now reigned for 250 years
among us
We beg you to make known to us
your mind in this matter
20 Soho Square, London

This charming form of invitation was used by Crosse and Blackwell to bid their friends partake of a "culinary adventure" to celebrate their quarter-millenium.

Advances in Food Technology

BUTTER AND MARGARINE

Consistency Tests

Apart from taste and flavour, the consistency of butter and margarine is an important factor in quality. The term consistency covers a number of different characteristics, including hardness, viscosity, plasticity, elasticity, elongation, tensile strength and cutting resistance. Research at the Milk Research Laboratory, Hanover, has shown that the cutting resistance is generally an adequate criterion for the assessment of consistency. Cutting resistance tests have been carried out on samples of commercial butter and margarine. Results showed a wide scatter, especially in the case of summer margarine, and proved that there is considerable room for improvement. With butter, it is possible to judge the strength properties by means of microscopic observations of the crystalline structure of frozen sections. The crystalline structure of margarine is often totally different, but the tendency is to adapt its structure to that of good, solid summer butter and soft winter butter, respectively.—W. Mohr and H. J. von Drachenfels, *Fette, Seifen, Anstrichmittel*, 1956, **58**, 609.

ICE CREAM

Infra-red Drying of Ice Cream Powder

For the production of ice cream, the water content of ice cream powder containing egg yolk, milk powder and sugar must be reduced from 7-8% to about 1·5-2·5%. This is usually done in revolving gas-heated drums where the drying of 30 kg. of ice cream powder takes about 60 to 80 min. The Hungarian Institute for Chemistry and Food Research has experimented with infra-red drying. The experiments showed that, after further development, and especially if applied in conjunction with the drum drying process, the method is likely to lead to a considerable reduction in drying time and cost. Moreover, it precludes the risk, inherent in the present method, of the sugar being burnt by local overheating.—J. Kottasz and T. Perlusz, *Gordian*, 1956, **56** (1339), 24.

BREAD

Determination of Dry Milk

A method has been devised for the determination of non-fat dry milk solids in bread by paper chromatography. The lactose, which usually comprises 50% of the non-fat dry milk solids, is separated from residual maltose by descending paper chromatography with a *n*-butanol-pyridine-water system containing silver nitrate. The optical densities of the silver spots are then determined in a densitometer. The concentration of lactose in the bread sample is read from a calibration graph prepared by running lactose solutions of the appropriate range of concentration on the same sheet of Whatman No. 1 filter-paper. Good results were obtained with laboratory baked loaves containing non-fat dry milk solids. The method eliminates the blank determination, which has proved a source of error in fermentation methods.—H. Zentner, *Analyst*, 1956, **81** (965), 483.

MEAT

Keeping Quality in Plastic Packs

Investigations have been carried out on the keeping quality of pork and beef packaged in plastic film and stored at different temperatures, *viz.*, at refrigeration temperature (0 to +2°C.), at room temperature of 15 to 18°C., and at room temperature of 20 to 23°C. On the day of the purchase all purchased samples showed a marked bacterial growth, especially as far as psychrotolerant microbes are concerned. Even at refrigeration temperature, the growth of these microbes is not completely impeded. At room temperature, the meat will show bacterial decomposition after two or three days. When examined under filtered ultra violet light, the samples showed, especially at the bottom and on the corresponding side of the cardboard sheet, an intensive yellow-greenish fluorescence which was found to be due to *Pseudomonas fluorescens*. The use of such cardboard sheets, designed to give the meat cut mechanical stability, is not recommended because they promote bacterial growth and introduce a disagreeable flavour. As a whole, the investigations showed that fresh beef or pork pre-packaged in plastic film must be regarded as perishable food.—E. Walz, *Die Fleischwirtschaft*, 1956, **8**, 543.

DOUGH

Extensogram Analysis

A method based on the evaluation of the slope and intercept of the line of minimum slope has been applied to the analysis of extensograms at constant extension. This method gives information on the elastic and viscous properties of dough. Variations in the absorption and salt content of dough have been used to demonstrate the application of the method.

As the absorption or salt level was increased, the viscous property of the flour was decreased. The elastic property of the flour was increased by salt. The influence of absorption upon the elastic property was dependent upon the salt level used.—B. Grogg and D. Melms, *Cereal Chem.*, 1956, **33** (5), 310.

Machinery and Equipment

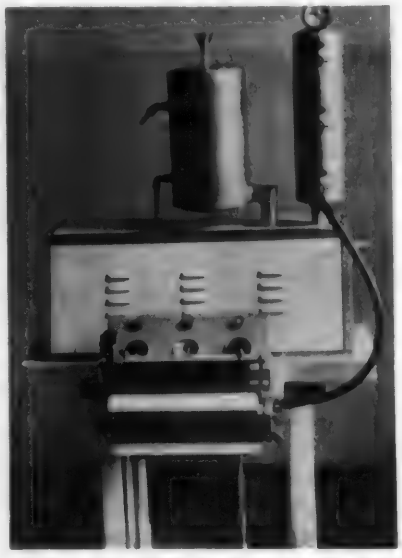
VACUUM SEALER

All kinds of food, when sealed under vacuum will, if kept in a cool place, remain fresh for a long period.

The "Universal" vacuum sealing machine consists of a table model sealing apparatus combined with a vacuum unit. Both are mounted on a console. The machine can also be adapted to a wall fixture.

The extraction of air from the filled bag is achieved by means of a vacuum nozzle, which lies between the cooling chamber and the sealing frame. When the foot pedal is pressed, air is immediately extracted through the nozzle which is drawn back, and the air-tight pack is then heat sealed. Every bag or packet remains fully visible during the operation and this ensures perfect sealing.

The new machine (models DEVa500 and DEVb500) will seal polythene, Cellophane and similar materials. U.K. distributors are Foodtech Ltd.



Vacuum sealing machine consisting of a table model sealing apparatus, combined with a vacuum unit.

PROPORTIONING SYSTEM

The "Select-O-Weigh" automatic proportioning system is said to be applicable to almost any industry in which materials are mixed into batches of fixed or variable formulæ. It brings the whole of the feeding, weighing, mixing and discharging cycle under the control of a central panel on which the weights of individual ingredients may be set up by manually operated dials or by a punched card programming device.

In a typical installation each ingredient is stored in a supply bin terminated by an electrically powered discharger. The dischargers feed into the weigh hopper of a dial scale, whose hopper is also equipped with an electrically operated discharge device.

A device in the dial head sets up an electrical condition analogous to the angular displacement of the pointer. The remote control panel also contains the means of setting up an electrical equivalent of any desired weight for each ingredient.

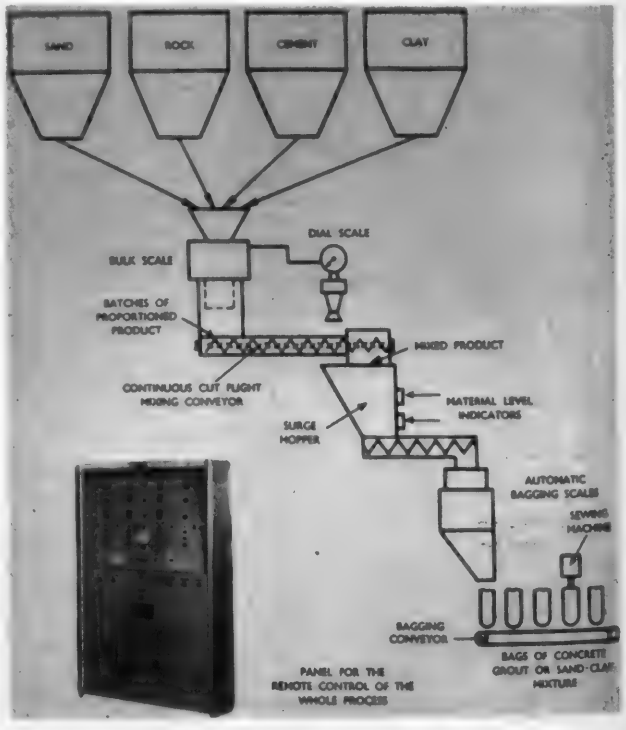
When the equipment is started, the first ingredient feeds into the dial scale, whose electrical condition is continuously compared with the corresponding condition set up on the panel. When the two coincide, feeding of the first ingredient stops and the feeders for the second and subsequent ingredients are automatically energised each in its correct sequence. On completion of the batch, the weigh hopper discharges automatically into a mixer, conveyor or other receptable, and the Select-O-Weigh system resets itself for the next batch which may be automatically or manually initiated as desired.

Automatic tare checks prevent the start of a batch unless the scale is in perfect empty balance. It is customary to provide interlocks and sequencing for conveyors, mixers and other auxiliary equipment; and it is possible to provide several different kinds of remote recording and indication of the performance of the system.

There are few limitations on the number, nature and quantities of the materials handled. Up to a dozen ingredients can be handled by a single scale; multiple scale installations can deal with far more complex formulations.

The Select-O-Weigh system was originated by the Richardson Scale Company of Clifton, New Jersey. It is now manufactured and marketed by Henry Simon Ltd., who have undertaken an extensive research and development programme before releasing the equipment to British industry.

A demonstration of the system is being arranged and interested companies should apply for details to C. R. Hicks, Henry Simon Ltd., Cheadle Heath, Stockport.



A typical application of Simon Select-O-Weigh system.

THREE-WAY VALVE

After two years' research by the Dutch dairy industry, Talbot Stead have introduced the Cupford valve to the general market. They claim that this is the first valve to be made with a three-way diaphragm. There is no mechanism in the fluid.

The valve is simple to operate and is fitted with a selector device that clearly indicates which side of the valve is closed. This indicator can be seen from a distance and prevents the mistakes which can happen so easily with ordinary diaphragm valves.

It is leakproof and the mechanism is very simple; one nut clamps together the whole of the assembly. The bottom cap can be removed for full inspection of the inside of the valve, and this can be done even when one side is closed and under pressure.

CONTINUOUS ICE CREAM FREEZER

The *Hoyer* continuous ice cream freezer, marketed by the A.P.V. Co. throughout the world outside Northern Europe, has been re-designed for manufacture at the company's Crawley Works.

The frame is now of fabricated mild steel and a polished stainless steel housing, with large inspection covers for access, encloses the whole machine. All controls and instruments are grouped on a conveniently placed panel.

The mechanical design of the machine follows the original well proved principle but certain details have been re-designed to accord with APV practice.

The first APV made model to be marketed will be of 175 Imp. gal. per hr., capacity, but other sizes are being developed.

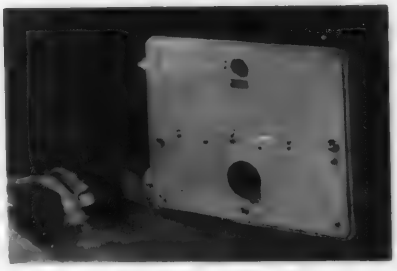
LABORATORY MIXER

An improved laboratory mixer, fitted with a high-speed turbine type head, is now being produced by Premier Colloid Mills Ltd. They claim that this head, which they call the *Premier Dispersator*, gives results comparable to intricate high-speed machines relying on ultrasonic vibrations.

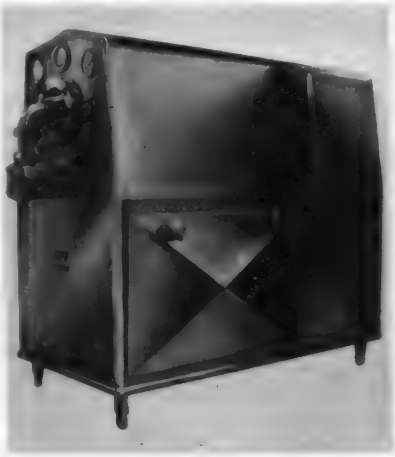
The speed of the mixer is continuously variable up to 4,000 r.p.m., and the bearing and collet arrangements used enables the shaft speed to be obtained without vibration or whip.

While the *Dispersator* is recommended as the best type of mixing head for general use, a marine type propeller can be supplied for gentle agitation, or a small cage type beater for thicker products.

A small clamp can also be supplied for mounting the mixer on the side of a bucket or similar mixing vessel.



Electronic batcher and counter, which will batch items in any specifically required quantity between 1 and 999,999.



Continuous ice-cream freezer.

Laboratory mixer fitted with a high-speed turbine type head.

ELECTRONIC BATCHER & COUNTER

Loma Electric Equipment Ltd., have recently added to their range an industrial electronic batcher and counter which is supplied as a basic unit giving exact requirements, thus showing a saving over other methods. With the mass production methods of today this equipment has been developed to meet demand for automatic batching and counting over a wide range of applications. The *Electroma* batcher and counter is operated from either photo-electric, inductive or mechanically keyed input signals and it provides two principal facilities: to batch items in any specifically required quantity between 1 and 999999, and to make a total count of the items instant by instant. The total number of batches can also be provided.

It has the speed and accuracy of a laboratory type instrument but is not complicated with their many special facilities, which, whilst of use in research and development, are not required in daily industrial applications. The makers have aimed at simplicity of operation, reliability, protection against water and dust and ease of maintenance and servicing.

Different batch quantities up to twelve "orders" can be arranged in accordance with requirements and are set in by a single rotary switch. An electro-magnetic counter housed in the equipment provides a direct reading of the number of items that have been counted.

In the standard basic unit form, a light source and photo-electric counting head is provided. An inductive counting head can be provided as an alternative where metallic objects are to be counted.

At the end of each batch, an output relay operates and the relay contacts may be used to control auxiliary equipment, such as a change over flap on a chute mechanism. The batch counter shown in the illustration was developed for a bakery, to count bread rolls into containers in preparation for despatch. Requirements were for lots of 25, 50, 75, 100, 125, 150 and 175, but this can be in any series according to individual requirements or application.

The equipment is housed in an aluminium cast box for wall or rack mounting, with a gasket sealed hinged lid. Complete protection is afforded against water, dampness and dust. The lid is fitted with a barrel type lock.

The two main assemblies comprise the power unit and the batching and counting units. The power unit provides all supplies and is located in the upper half of the housing. It can be easily withdrawn for test and examination by the release of two screws.

Loma Electronic Equipment Ltd. have recently moved into their new factory at Buckhurst Hill, Essex.

DRUM PRINTERS

To facilitate the printing of cylindrical containers, such as drums, Mark-O-Print Ltd., have developed auxiliary equipment for their *Rollmaster*, which prevents its tendency to slip when marking round drums.

The device can easily be adapted to take this improvement, and its usefulness will then be increased as it can be removed from its cradle without losing its versatility.

Two models are available. The *Drum-Major* in which the *Rollmaster* is suspended and the drum is placed on rollers mounted in a cradle; the printing being affected through friction by turning the handle of the machine. It is adjustable from diameters 6 in. to 11¼ in. and lengths of 4¼ in. to 17½ in. and is thus suitable for 1 to 5 gal. drums. The cradle is of sturdy construction and the *Drum-Major* can be laid on the floor and have a ramp attached so that heavy drums can be rolled up into position.

The other version, the *Rollmaster D.P.*, has a pair of support wheels ensuring a parallel grip to prevent slipping when marking around the drum; it is of course more suitable for larger drums, which, when full, may be awkward to handle.

As all Mark-O-Print models, the machines use *Easi-Lock* systems where different sizes and styles of type can be used together, and their very fast drying metal marking ink.

PROCESSES AND OPERATIONS PLOTTED

A new *Movigraph* wall chart is claimed to make it possible to build up a picture of practically every state, process or operation known to industry and commerce, and to give instantly a graphic appraisal of any position at a given moment.

The plastic panel which is the basis of the system has 2,000 perforations per sq. ft. Panels come in various sizes, the smallest being 23 in. × 11¼ in. They will butt together to form an installation of any given size.

There are six major signals, each in 12 colours, giving over 20,000 signalling combinations. Signals simply peg in the board, are easily removed but cannot be accidentally dislodged. Special signals indicate various things —for example, ring markers to show completed jobs. Figures and letters are available in various sizes and colours. Title frames, supplied for easy identification, will carry card strips bearing typewritten or handwritten data.

To chart the progress of any process, operation or activity, the chart is fitted with flow lines. Each of these consists of a length of distinctively coloured elasticated cord, pulled across the chart and kept in position by a peg. They return to starting position when not in use. Flow lines can be attached and removed by inexperienced hands.

An optional extra is a card index panel, containing 80 6-in. × 4-in. cards, each coinciding with a line of perforations on a panel. One index panel can be placed above another to allow for expanding requirements.

Where a card index is not required, an index holder, 3 in. long, can be inserted on a panel at any position, according to the amount of information to be accommodated. Each holder will carry up to 11 index strips, but can be shortened. Each panel is provided with hooks for hanging on a wall. Rubber studs prevent the back of the chart from rubbing against the wall.

Price of the *Movigraph* varies with the type and size of chart required. A small installation can be obtained for £6.

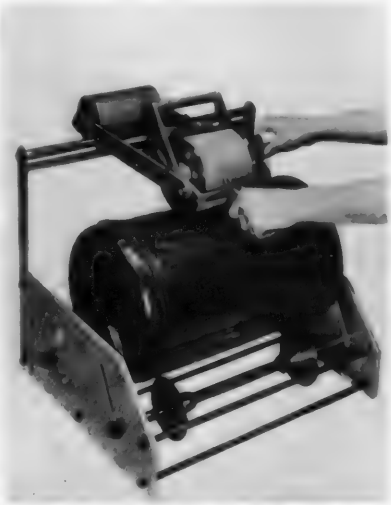
QUICK CHANGE TAPING UNIT

What is claimed to be the first British semi-automatic machine to seal cylindrical containers with self-adhesive tape and tear strips has been designed by Adhesive Tapes Ltd. and is marketed by the Sellotape Industrial Division of Gordon and Gotch Ltd.

The machine, the *Pneutaper*, is claimed to be capable of 30 to 40 sealing operations a min. and to handle tins, glass jars, cardboard drums and plastic containers with diameters ranging from 2¾ in. to 6¼ in. and heights from ½ in. to 8⅞ in. It will apply *Sellotape* from rolls of up to 350 yds. in length with a 3 mm. film tear strip.

The tins are first placed on the machine turntable. Then, as the start button is pressed, a clamp descends to push the lid on tightly and hold the tin firmly on the turntable. No careful positioning is needed. At the same time, the taping arm swings forward and the free end of the tape is attached to the tin. As the turntable rotates the tape is drawn on to the rotating container and pressed down by a wiper to ensure strong adhesion. If a container with a beaded lid is being sealed, the wiper rolls the tape over the bead. Tear strips are bonded to the tape as they pass between rollers on the way to the taping arm.

When the turntable has turned through 360 deg., plus about 5 deg. for the overlap, a cutting blade severs the tape leaving a short length of tear strip protruding. The clamp rises and the operator moves the container off the turntable by pushing it with the next tin to be sealed.



The Rollmaster being used for printing a round drum.

JUICE EXTRACTORS

A novel machine for the citrus-fruit industry was recently displayed at the International Fair of Messina by the Sicilian firm, Indelicato.

This machine, called the automatic juice extractor, has a special device to clean the peel internally, after the juice has been extracted, so that it is ready for use as candied peel.

It is made entirely of stainless steel, except for the polythene cups which lift the half-fruits against the revolving roseheads, and can treat about three tons of fresh fruit per hr. These do not have to be graded in sizes. Its average output is about 1,200 kg. per hr.

The extractor is driven by four motors with a total power of 4 to 5 h.p. The automatic sieve for the separation of seeds and pulp residue is incorporated in the machine, and all moving parts are mounted on a self-lubricating material, Rexilon, to reduce maintenance costs and prevent oil escaping into the juice.

The fruits are placed on the conveyor plate, from which they are automatically fed into separate channels. A mechanical arm, fitted with the polythene cups, first presses the fruits against stainless steel knives to cut them in halves, then against the revolving roseheads to extract the juice. As the arm returns to position the peels are automatically ejected from the machine.

Indelicato also make a smaller machine which produces about 300 to 350 kg. of lemon or 400 to 450 kg. of orange juice per hr. It is worked by two unskilled operators. Another machine, the type A/8, which treats about 4,500 fruits per hr. and is driven by a 2½ h.p. motor, has been especially designed for the smaller firm.

After extraction of juice, the peel can be fed into the *Super Sfumatrice* machine, which extracts the essential oils at a rate of about 1,200 kg. of peels per hr.

Everything for the Dairy Industry

Since it was first held, with 928 entries, at the Agricultural Hall, Islington, in 1876, the Dairy Show has become the chief social and competitive event of the year for the dairying and kindred industries. Since the war more than 10,000 exhibits have been staged each year. This year's produce display was the largest to be staged at the show since the war, particularly in bacon and cheese. Here are notes on some of the principal exhibits: a fuller account of the show is contained in the November issue of our associate journal *Dairy Engineering*.

The 70th Dairy show to be staged by British Dairy Farmers' Association was held at Olympia, London, from October 23 to 26 inclusive. Not all the exhibitors were able to have actual equipment on view and many of them displayed photographs and drawings, occupying office accommodation at the show to answer enquiries. A popular information service was provided by our associated journal **Dairy Engineering.** Many people visited the stand to discuss problems with the editor and his staff.

The A.P.V. Co. Ltd., presented information about the APV-Lanko complete and **fully automatic milk reception equipment,** claimed to represent the first use of modern methods of process timing and control in connection with the mechanisation of raw milk intake. Modified by A.P.V. from a Dutch machine to make it suitable for the needs of other markets, the equipment can be adapted to widely differing requirements. From the time the can is placed on the receiving conveyor until it is removed from the discharge conveyor, the whole of the intermediate operations of conveying, tipping, sampling, weighing, recording, pumping, can-washing and sterilising are done automatically.

A comprehensive range of **dairy laboratory apparatus** was shown by Boro Laboratories and Appliance Co. Ltd., which included glassware and chemicals. One interesting item was the *Elgastat* portable deioniser which produces triple distilled water without gas or electricity. Another item was the *Condesco* drip feed regulator for hypochlorite solution.

Automatic **butter and margarine packaging machines** were exhibited by Brecknell, Dolman and Rogers Ltd. The Mark II machine is made in a full range of English and metric brick sizes and weights and has a capacity of up to 110 bricks per min. It is available as a complete hopper feed machine or as a wrapping end only suitable for direct connection to continuous margarine processing units. The Mark III model has a capacity of up to 40 bricks per min. and is suitable for the smaller creamery or margarine factory where dual or multi-size packaging is necessary.

Visitors to the stand of W. J. Bush and Co. Ltd., were able to obtain the 8th edition of their booklet "Products for the Ice Cream Industry" and several other booklets. **Flavourings** displayed included essences, fruit juices, colours, ripple concentrates, ice lolly compounds, flavour emulsions and associated materials.

A complete range of **laboratory apparatus** for the dairy and ice cream industries was exhibited by C. and J. Byrne. A special feature was the *Simplex* outfit for the methylene blue and resazurin tests, costing only 52s. 6d.

Clares (Wells) Ltd., showed a range of **cheesemaking equipment** for the factory and the farmhouse. It included a 500-gal. *Clarilac* cheese vat with agitating gear.

An in-crate **bottle washer,** in which bottles are washed by the hydro method was displayed by Cockx and Sons (London) Ltd. Their stand also featured bottle filling and capping equipment as exemplified by the speedy type R-4 valve bottle filling and Ford cap making machine with an output of 1,400 bottles per hr.

An interesting item shown by the Dairy Supply Co. Ltd., was a **bulk milk farm storage tank** conforming to Milk Marketing Board specifications. The new tank makes use of the ice bank type of cooling system which replaces the plate evaporator type previously used. An outstanding advantage claimed for the ice bank system is that it is more economical to operate. A cleaning unit consisting of a pressure jet rotated by the milk agitator drive unit was also shown.

Cheese making equipment on their stand included a new type of curd mill. A film showing the operation of the mechanical curd cooler/salter and mixer (*see* p. 459) was shown.

Fishers Foils Ltd., featured a model "supermarket" self-service store. One exhibit was a new **waxed paper laminate** which, it is claimed, is not subject to "de-laminating."

An improved model of their *Junior* **bottle washing machine,** which won a Silver Medal at the 1953 show, was displayed by Gimson and Co. (Leicester) Ltd. The improvements include a variable speed drive incorporating brake and clutch, intermittent jetting on the final rinse and complete, one-piece installation of the machine.

Since last year's Dairy show a completely modified bottle crate **decrating machine** has been developed by G. Hopkins and Sons Ltd. which can operate up to 17 cycles per min. and has, by dealing with two crates of 24 bottles per extraction, de-crated at the rate of 48,000 bottles per hr. The new model has a centralised lubrication system and a re-designed overload clutch.

Rose Bros. (Gainsborough) Ltd., showed a range of **packaging** and wrapping equipment which included their M.T.P. machine for pleat wrapping in transparent film, tissue, wax-paper or parchment: pies, puddings, cakes, cheeses or similar articles.

A "zip-fastener" type of **cheese packing** was displayed by Venesta Ltd. It consisted of a foil wrap with a tab attached to the triangular piece of foil forming the base of the cheese segment. When the tab is ripped off it releases the edges of the top part of the wrap. A wide range of other foils for a variety of purposes ranging from capping strips to foil for butter wraps, ice cream, etc., was also exhibited by Venesta. They included foil/parchment wrappers for butter, printed, embossed and also printed on the dull side—a method of using foil with economy.

R. W. Webster took office space to give information about their **sterilised milk processing plant** and machinery. A number of high capacity plants have been supplied to European countries where processing times and temperatures vary from 230°F. to 245°F. and holding times from 35 min. to as little as 8 min. The company is installing a continuous steriliser in Finland with an output of 11,000 bottles per hr. and with a processing temperature of 242°F. The machine is connected to a bottling plant on the second floor of the building, the bottles being automatically loaded into the steriliser without any handling, the finally processed and cooled bottles being automatically discharged on the ground floor. Installations have also been carried out in Belgium, Holland, Italy, Western Germany and France.

News Digest

Frozen egg—a national menace?

The health committee of the Association of Municipal Corporations has told Mr. Heathcoat Amory, the Minister of Food, of the danger to health arising from the possibility of infected frozen egg being used in food for human consumption. It has urged him to dispose of the Ministry's stocks so that there should be no risk of human consumption.

This follows protracted correspondence between the association and the Ministry on frozen whole egg and dried egg compounds which have been found to be contaminated with food poisoning organisms.

In a letter to the committee a Ministry official said that only a portion of the total stocks of frozen egg throughout the country is Ministry property. Full details of the Ministry's remaining stock of Chinese frozen whole egg have already been given to the Ministry of Health which has arranged for samples to be taken for laboratory tests.

Imports of frozen egg from the Commonwealth are also being regularly tested by the port health authorities.

The Ministry's letter stated that no obstacles would be placed in the way of the effective discharge of the duties of local medical officers of health and that he would not withhold his consent to destruction of such infected frozen egg as would be properly condemned if privately owned.

Dr. K. E. A. Hughes, director of Portsmouth public health laboratory has also complained about the danger to health of imported frozen eggs. He said that of the last 171 samples examined at Portsmouth about 44% were infected. He was addressing a meeting of the Royal Society of Health. Concerning synthetic cream, he said that it had been the cause of most paratyphoid fever in this country in recent years.

Glycerine publicity drive

The U.K. Glycerine Producers' Association is starting an educative public relations campaign to bring to the attention of industry new and improved applications of glycerine and its derivatives. Since it was first "discovered" in 1779 by a young Swedish scientist, Dr. Karl Wilhelm Scheele, glycerine's uses have multiplied until today there is no other individual organic compound enjoying as wide a selection of markets.

The Association state that aside from its natural presence in animal and plant metabolism, its diversity may be summed up by noting that the average human being in civilised lands is assisted into the world by glycerine, is served every hour of the day and night by household, office, amusement, beautifying, decorative, nutritive, preservative and curative products which contain glycerine in some form, and is finally embalmed with solutions containing a glycerine base.

In foods and beverages; cosmetics, toiletries, and pharmaceuticals; in paints; in textiles; in tobacco; in paper and printing; in explosives; and in countless other products; glycerine's key role as a humectant, as a preservative, as an emulsifier, as a solvent, etc., is universally recognised.

It is now used in over 2,000 individual products and processes, indicating an increase of over 25% as compared with pre-war applications. Annual production in recent years is in the region of 50 million lb.

Filmstrip on corn

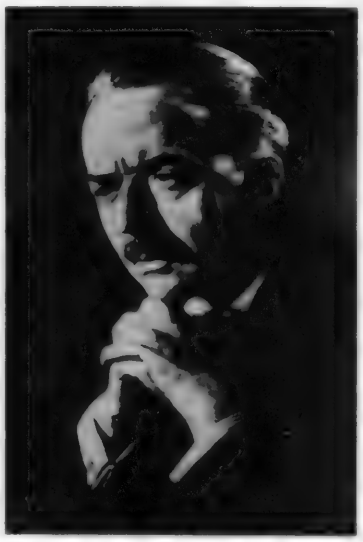
A filmstrip, "The Story of Corn," has been produced by Educational Products Ltd. in collaboration with Kelloggs Ltd., covering the growth, harvesting and storage of corn to its final production in the form of breakfast cereals. The filmstrip, which is in colour, consists of 28 frames and costs 25s., including notes.

"Outlaw sale of animal foods for human consumption"

Selling animal food for human consumption should be a statutory offence, urges a member council of the Association of Muncipal Corporations, representing over 400 borough councils throughout the country. The council told the association of cases where tinned milk, infected peas and excessively fat beef had been sold to the public after they had been disposed of for animal feeding purposes.

The council pointed out that, except for the prohibition of the sale for human consumption of products derived from animals slaughtered in a knacker's yard, no action could be taken with regard to these foods under the Food and Drugs Acts unless a magistrate's order had been obtained for its condemnation. It urged that provision should be incorporated in future legislation to include, as a statutory offence, the sale or utilisation for human consumption of any food primarily intended for, or sold for animal feeding purposes or inedible purposes.

Leonard Hill to visit Australia and the U.S.



Mr. W. Leonard Hill

Mr. W. Leonard Hill, founder and chairman of the Leonard Hill Technical Group, plans a round-the-world trip to consult with the Group's agents, advertisers, contributors and other associates in Australia and the United States.

Mr. Hill will be accompanied by his daughter, Miss Lynette Hill, a member of the firm who will act as his secretary. Mr. Hill's addresses during his tour are as follows:

January—c/o Nock and Kirby Ltd., 417-21, George Street, Sydney.

February/March—c/o Hixson and Jorgensen Inc., 3257, Wilshire Boulevard, Los Angeles 5, U.S.A.

March/April—92, Lorraine Ave., Upper Montclair, New Jersey, U.S.A.

Preparation of pre-cooked baby food

Directions for use issued by manufacturers of pre-cooked baby foods should include a warning that the product should be freshly prepared each time before feeding a baby.

This suggestion is made by Mr. T. McLachlan, Public Analyst of Chelsea, in his annual report. It was hoped, he said, that the matter might be discussed between public analysts and the Ministry of Health, but up to the time of the publication of the report this had not been possible.

New ice-cream depot for Sevenoaks

A new 4,500 sq. ft. ice-cream depot has been built in Sevenoaks, by T. Wall and Sons, Ltd., to replace their old depot there. More than 6,000 gal. of ice cream from the firm's Acton factory will be kept at a temperature of −15°F. in the depot's cold store.

Safety centre

Mr. C. D. Lovell, the works director of Alfred Bird and Sons, Ltd., announced at a recent meeting of the Birmingham and District Industrial Safety Group that the total amount required to acquire and equip the new industrial safety centre had been subscribed. The amount required was £4,000 and £4,579 had been received from the 75 members of the group. Twenty-seven courses will be held there between now and April.

Cockroach repellent

A new insect repellent, *M.G.K. Repellent II*, has been introduced to counteract the menace of cockroaches. When used with pyrethrum insecticide, it is claimed not only to disperse the insects but also to ensure that a high percentage of those venturing near the treated area are killed. Developed by Phillips Petroleum Co. of Oklahoma, it is being marketed by an American concern whose agents in London are Joseph Weil and Son, Ltd. It can be used with pyrethrum sprays in bakeries, food plants, bottling plants, warehouses, and any home or industrial establishment where food is handled.

In laboratory tests the mixtures has proved effective for a period of 14 weeks and in the field the minimum period is usually from four to five weeks. The chemical formula for the repellent is 2,3,4,5-bis (△2-butylene)-tetrahydrofurfural. It has been registered for use as a cockroach repellent by the United States Department of Agriculture. The pyrethrum formulation may or may not be synergised and the diluted spray as applied should contain 1% of the repellent by weight.

Spray application should be made at intervals of four to six weeks with a pressure sprayer almost to the point of run-off, care being taken to spray behind sinks and in warm places where cockroaches congregate. The repellent is compatible with chlorinated hydrocarbon and organo-phosphorous compounds, but tests have shown that these combined sprays are not particularly effective. They are too slow in action and cause the cockroaches to scatter before they pick up the amount of insecticide required to infect them. *M.G.K. Repellent II* is, therefore, particularly recommended for use with pyrethrum sprays, because pyrethrum's "knockdown" effect prevents the cockroaches from dispersing.

OBITER DICTA

● The Antarctic might have a future use as a vermin-free store for the world's periodical food surpluses.—*President of the British Association.*

● "It's probably one of the largest orders for sausages ever placed. We always welcome them by the mile."—*Chairman of Smedley's.*

● If the specific gravity of potatoes is too low, French fries will turn out grease soaked, dark brown, and scorched tasting.—*U.S. Department of Agriculture.*

● A tin of kippers *is* refreshment and can be sold by a shopkeeper on Sunday. A packet of tea *is not* refreshment and a shopkeeper who sells it on Sunday can be fined.—*High Court decision, quoted in Daily Express.*

● Learn to know your man. Treat them as individuals; find out about their hobbies, their families, their joys and their sorrows. In short, ice cream is a personal business.—*Wall's chairman.*

● When the orderly officer to British troops at Archangel, given caviare, asked "Any complaints?" an N.C.O. replied, "The men are grumbling sir, because the jam tastes of fish."—*Manchester Guardian.*

● The cast deserve the highest praise for the way they set about tackling the menace of X—*The Unknown*, a mass of bubbling porridge which lives on radium and stalks through hospitals scaring people to death—*Film critic, The Times.*

● There is an unreasoning obstinate trait in human nature that makes people hanker after such old-fashioned, unproductive, inefficient aspects of shopping as gossiping with the grocer and the friends they meet in his shop.—*Dr. Charles Hill, ex-Parliamentary Secretary to the Minister of Food.*

● In the Accounts of the Lord Steward's Department for 1686 is an entry for a dozen dishes of ice cream, costing £1 each, as part of the fare purchased for James II and his officers at camp on Hounslow Heath. The earliest reference to ice, or iced cream is in the New English Dictionary dated 1769.—*Letter in The Times.*

New cooked meat factory

Stirling Co-operative Society have opened a cooked meat factory in Abbey Road. The walls are all tiled to almost ceiling height, and the colour scheme is white. There are three sections, the cooking room, the sausage production room and the despatch department, plus office accommodation.

Mr. James Ferguson, who was recently appointed manager of the fleshing department of the society, says that work in the factory at the moment is confined to the manufacture of sausages, potted meat, black puddings, boiled bacon and dripping. They supply the baking department with pie meat. But in the near future there will be a range of cooked meats.

The factory is producing upwards of 2½ tons of sausages per week. Production of these will increase.

Silicone barrier cream

A silicone barrier cream for use against dermatitis in the flour, confectionery and other food industries has been developed by Lloyd-Hamol Ltd. Known as *Syl*, the preparation utilises the water-repellent and flexible properties of the silicones to form an invisible film which is said to prevent harmful contact, particularly with water-borne irritants. Since the silicones are permeable to vapour and gas, the skin is allowed to breathe and discharge its secretions at the same time as it is protected. Although *Syl* is primarily a protective preparation, the makers have incorporated the non-irritant antiseptic hexylresorcinol to bring under control inflammation or any infection of the skin that may be present. The cream is an ethical preparation and is prescribable under the Health Scheme.

Brook Motors' new factory

Work is to start immediately on a new factory at Honley, near Huddersfield, for Brook Motors Ltd.

The new building, which is scheduled for completion in 12 months' time, will consist of three factory bays with north lighting, plus a flat-roofed section which will house administration, welfare, etc., all accommodation being on one floor only. Total floor area will be 75,000 sq. ft. and the works area will be 570 ft. long by 105 ft. wide. The rather long building has been chosen so that unidirectional production of fractional horse power motors may be planned on the modern scale to give high output with minimum handling and labour. The present fractional horse power motor department at Empress Works will be transferred there along with a large number of workers, and it is estimated that a total of about 500 people will be employed at Honley after the first three months.

COMPANY PROFITS AND PROSPECTS

Horlicks' profits rise

The group profits of Horlicks for the year ended March 31 amounted to £796,035, an increase of £46,878 over last year's profit. The proposed final dividend is 16¼% again making 30% for the year. In addition a bonus of 5% is repeated.

*

Canners' profits fall

Trading profit of Stratford-on-Avon Produce Canners' for the year ended May 31, declined to £50,143 from £60,284 for 1954-55. The Ordinary dividend is maintained at 25%.

*

Biscuit profits down

The group profits of G. and T. Bridgewater, biscuit manufacturers, fell to £28,138 this year, as compared with £53,493 last year. A final Ordinary dividend of 7½% has been declared, making 12½% for the year ended April 30, on the capital increased by one-for-one issue of fully paid "A" shares (25% for 1954-55, plus a capital distribution of 18¾% from realised profits on investments on the smaller capital).

*

Capital squeeze may delay Heinz' projects

Owing to the restrictions on capital expenditure, the building of some of the facilities of H. J. Heinz' new factory may be postponed. This was stated by Mr. W. B. Cormack, managing director of the firm, at the 40th annual general meeting. Nevertheless the new factory, at Kitt Green (Lancs.) will come into production on schedule, in October, 1957.

Further development projects are planned for the Harlesden factory, including the construction of 150,000 sq. ft. of warehouse and storage space and modernisation and re-arrangement of existing equipment.

These projects are part of the company's long-term development plan to meet increased home and overseas demand. Mr. Cormack reported that export sales increased by 11½% last year and that the gross trading profits were £3,611,000, the highest ever. Total sales increased in value by 17·2% and in volume by 19·7%, also a record figure. Four interim dividends of 8% were paid on Ordinary capital, providing a distribution of 32%, compared with 30% for 1954.

*

600 Group name change

At an extraordinary general meeting of George Cohen Sons and Co. Ltd., held in London recently, resolutions were passed changing the name of the company to "The George Cohen 600 Group Limited" and amending the Articles of Association.

Erections and Extensions

Cow and Gate, Ltd., are erecting a storage building at Leatherhead, Surrey.

*

A pig testing station is being erected at Sealand, N. Wales, for the **Ministry of Agriculture, Fisheries and Food.**

*

Allied Bakeries, Ltd., are planning to construct a store and canteen building in Cox Lane, Surbiton, Surrey.

*

W. and R. Jacob and Co. (Liverpool), Ltd., are planning to construct garages at Old Barracks Station, Gallowgate, Glasgow.

*

The Scottish Grain Distilling Co., Ltd., Glasgow, E.5, are planning to build an additional warehouse in London Road, Glasgow, E.2.

*

A herring reduction and fishmeal factory is to be erected at Mallaig, Inverness-shire, by **The Herring Industry Board.**

*

Buchan Meat Producers, Ltd., have had plans approved to erect extensions to their slaughterhouse at Peterhead.

*

At Longman Industrial Estate, Inverness, production has started in a new factory opened by **Highland Sweets (Inverness), Ltd.** At first the firm will make sweets for local consumption, but eventually they will export to the south. As the nearest similar factory is at Aberdeen the firm hope to overcome the burden of freight charges in marketing their produce in the Highland area.

*

Swift and Co., Ltd., London, E.C.1, are having a meat storage and distribution depot erected at Brunswick Square and Inner Ring Road, Southampton.

*

W. J. Brookes and Sons, Ltd., Trafford Park, have plans in hand for the erection of a bakery at Shady Lane, Roundthorne Industrial Estate, Manchester.

*

Rowntree and Co., Ltd., have had plans approved for the erection of two more blocks of premises to their chocolate factory at Fawdon, Newcastle-on-Tyne.

*

Erimus Ice Cream Co., Ltd., have had plans prepared for the proposed erection of extensions to their factory in Middlesbrough, Yorkshire.

*

Watson Meats, Ltd., have had plans approved for the construction of extensions and a food production department at their premises in Welbeck Road, Newcastle-on-Tyne.

*

T. Wall and Sons (Ice Cream), Ltd., have had plans prepared for the proposed erection of an ice cream depot on a site at Bilborough Trading Estate, Nottingham.

Take-over offer for jam firm?

Shareholders of T. G. Tickler Ltd., the Grimsby jam and preserves firm have been told to expect an offer for their shares at an early date. The terms, says the board, will be advantageous and shareholders are advised not to sell in the meantime. In a letter, the directors say that negotiations are now proceeding, and state that the directors "wish you to know that these matters are in progress, the outcome of which, they consider will be to the advantage of members. In the meantime, it is recommended that you take no action with regard to your shareholding until you hear further from the company.

The firm was founded in 1878 by the late Mr. T. G. Tickler, grandfather of the present managing director, Mr. John Tickler. It formerly operated factories at Southall, London and in Scotland, but for several years production has been concentrated at Grimsby. Shareholders are unable to say whether the Grimsby factory will continue as a main manufacturing centre in the event of a change of control. A substantial portion of the shares are held by local people. The Southall premises were sold to the B.T.H. Co. after production ceased there, and the Scottish establishment has been used as a distribution centre. The board of the company was reconstructed in 1954 when several of the Tickler family directors who had been more closely associated with the Southall factory, were not re-elected.

PEOPLE

MR. G. D. S. BLACK becomes chairman of T. Wall and Sons (Meat Products), Ltd. He joined Wall's in 1954 from Mac Fisheries, Ltd.

MR. F. G. CRABB has been appointed managing director of the H. J. Heinz Co. He succeeds MR. W. B. CORMACK, who is retiring from that post, but will remain on the board.

LORD TRENCHARD, formerly vice-chairman of T. Wall and Sons (Meat Products), Ltd., becomes chairman of a new subsidiary company, T. Wall and Sons (Handy Foods), Ltd.

MR. J. STEBBINGS has been appointed Food Controller to Whiteleys Ltd., London. He formerly worked for Civil Service Supply Stores and Harrods Ltd., and for the past two years ran his own business.

MR. C. J. CHILD, sales manager of the packaging division of John Dale Ltd., has now been appointed acting secretary of the company. MR. S. G. H. DAVIS has joined the company as sales manager.

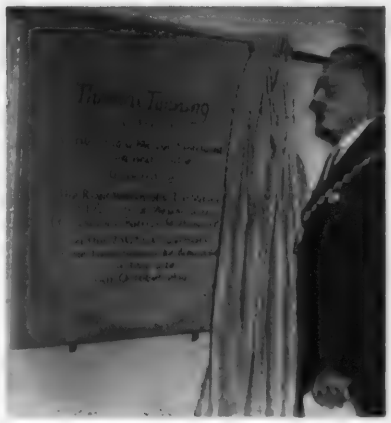
MR. C. H. AUSTIN has vacated his position as secretary of Scribbans-Kemp on his appointment as assistant managing director of Scribbans-Kemp (Bakeries). MR. R. RIGBY has been appointed secretary of Scribbans-Kemp.

SIR HUGH BEAVER, managing director of Arthur Guinness, Son and Co. Ltd., has been elected deputy president of the Federation of British Industries. Sir Hugh, who was knighted in 1943, was awarded the K.B.E. in this year's New Year Honours.

MR. JOHN H. PENNY has been appointed marketing director for T. Wall and Sons. He joined the Unilever organisation in 1933. Until this appointment he was general sales manager for Van den Berghs, Ltd. He is 40.

MR. J. D. O. KNOWLES, formerly resident director at the Godley, Manchester, ice cream and meat-products' factories of T. Wall and Sons, Ltd., becomes chairman of T. Wall and Sons (Ice Cream), Ltd. He is succeeded at Godley by DR. P. RIDLEY.

MR. PAUL SCHWARZ, grandson of the founder, has recently joined the staff of Polak and Schwarz (England) Ltd. Mr. Schwarz has had wide experience of conditions in other branches of the firm, having travelled extensively in the Far East and America.



The Mayor of Westminster unveiling a plaque commemorating Thomas Twining (1675-1741), founder of the business of R. Twining and Co. Ltd., at a ceremony to mark the firm's 250th Anniversary. The unveiling took place at the company's premises at 216 Strand, W.C.2., which they have occupied since 1706.

MR. ARTHUR J. GOODBODY, managing director of Escoffier Ltd., the London sauce, pickle and food paste firm, has recently returned to this country after a tour of the U.S. and Canada. He was impressed by the hospitality offered by the Americans and by their interest in British goods. In spite of frequent requests to attend press conferences and to appear on radio and television, Mr. Goodbody was able to visit some of the stores, multiples and supermarkets, which are now the largest selling organisations in the U.S.

MR. W. A. HARVEY has been appointed to the board of directors of W. Symington and Co. Ltd. Mr. Harvey, a Scottish chartered accountant and university lecturer, has been secretary of the company for the past five years. MR. R. A. YOUNG will replace Mr. Harvey as secretary.

MR. HAROLD GODDARD, director and Midland regional buyer, has just retired from Smedley's Ltd. Associated with the Smedley family for nearly 50 years, Mr. Goddard was well known in the Midlands as fruit and vegetable buyer. He was elected to the board in 1937. MR. B. A. H. SHAW succeeds Mr. Goddard as Midland regional buyer.

MR. H. R. HUMPHRIES, C.B.E., has relinquished his directorship of British Oil and Cake Mills, Ltd., on reaching the age of 65. He joined the Olympia Oil and Cake Co. in December 1910 and apart from his army service in the First World War, has been concerned for 45 years with the buying of raw materials and selling animal feedingstuffs. In September 1939, he joined the Ministry of Food where he was later appointed deputy director of the Animal Feedingstuffs Division. In 1943 he became director of the Division, a position which he held until he returned to British Oil and Cake Mills Ltd. as a director at the end of 1953. In that year he was awarded the C.B.E.

MR. P. L. MARTIN, who for the past three years has been factory manager for Messrs Brains (Foods Products) Ltd., Bristol, was on October 1, appointed a director of the company. Before joining Brains, Mr. Martin was assistant factory manager at the Lowestoft canning factory of Beecham Foods Ltd. He commenced his career in the food industry with J. Sainsbury Ltd. in their London factory.

Mr. Martin is hon. secretary of the Bristol Junior Chamber of Commerce and Shipping. He is also their representative on the Clean Foods Advisory Committee.

In consequence of the death of the chairman and managing director, Mr. S. H. Elkes, M.B.E., J.P., the following appointments have been made:

C. H. Elkes and Sons Ltd., Uttoxeter.

MR. W. E. ELKES (retaining the office of joint managing director) has been appointed chairman, and MR. A. N. ELKES, joint managing director.

Elkes Biscuits Ltd., Cardiff.

MR. W. E. ELKES (retaining the office of joint managing director) has been appointed chairman, and MR. A. R. LAND, joint managing director.

Elkes and Fox Ltd., Burscough Bridge.

MR. M. S. FOX (retaining the office of joint managing director) has been appointed chairman and MR. W. ELKES, joint managing director. MR. A. N. ELKES has been appointed director.

Obituary

DR. HENRY REIST KRAYBILL, director of research and education of the American Meat Institute Foundation died in Chicago recently at the age of 65. He leaves a wife and three sons.

MR. W. E. CLARK, until 1953 the manager of the Birmingham and Midlands territory for the English Electric Co., died recently, aged 68. Mr. Clark completed 50 years' service with the company in 1952. For the past three years he had been engaged in consultative duties. He leaves a wife and one son.

MR. JAMES E. WILSON, chairman and governing director of the Ormeau Bakery Ltd., Belfast, died at his home recently at the age of 79. He devoted his whole life to extending the bakery, which was founded by his father, Mr. Robert Wilson. He succeeded his father as managing director in 1928. He leaves a wife, son and two daughters.

FORTHCOMING EVENTS

Society of Chemical Industry

Food Group

November 6. "New sources of Human Food," by N. W. Pirie. Joint meeting with the Birmingham and Midland Section. 6.30 p.m., Birmingham and Midland Institute, Paradise Street, Birmingham.

November 14. Conversazione, by invitation of Messrs. James Pascall Ltd., Mitcham, Surrey.

November 28. 1. "New Aspects of the Evaluation of Biscuit Flour," by G. W. Clewlow and W. Dixon. 2. "The Stability of Vitamin C in a Commercial Fruit Squash," by Dr. A. E. Bender. 6.45 p.m., Society of Chemical Industry, 14, Belgrave Square, London, S.W.1.

Oil and Fats Group

November 7. "Some Aspects of the Edible Fats Industry in New Zealand," by S. G. Brooker. 6.15 p.m., Society of Chemical Industry, 14, Belgrave Square, London, S.W.1.

Incorporated Plant Engineers

November 8. "Industrial Refrigeration," by L. Perrin. Merseyside and N. Wales branch. 7.15 p.m., Exchange Hotel, Liverpool.

November 30. "Canning," by R. F. Rooke and Miss C. MacNab. Ladies' evening at Birmingham branch. 7.30 p.m., Imperial Hotel, Temple Street.

Food microbiology symposium

The 2nd international symposium on food microbiology, arranged under the terms of the Section 21 resolution at the 6th International Congress for Microbiology, is to be held in Cambridge from April 8-12, 1957. The subject is to be "The Microbiology of fish and meat curing brines," and topics suggested for discussion are:

1. *The bacteriology of ingredients:* water, salt (halophilic bacteria); other curing salts, sugar.
2. *Bacteria brought in on fish and meat.*
3. *The action of ingredients on micro-organisms:* salt, nitrate and nitrite, sugar, acids esp. lactic.
4. *The general flora of curing brines:* for fish, beef, bacon.
5. *The significance of special groups of bacteria in curing brines:* halophiles, faecal bacteria, de-nitrifying *bacilli*.
6. *Chemical reactions in curing brines:* changes in redox potential, reduction of nitrate, maturation of brines.
7. *Discussion* aimed at (*a*) specification of the "normal" floras of brines and methods of observing them, (*b*) practical tests for determining the condition of a curing brine.

The proceedings of the symposium are to be published as a Food Investigation Special Report by H.M.S.O.

Technical Press Review
November

Automation Progress.—Electronic Detection of Tramp Metal; Automatic Control in the Process Industries, 1; Differential Current Meter; Cybernetics, the Science of Control Systems; Automation in Weighing; The Loop; Product Design by Computer; Collar Making Machinery; Automation Highlights in the U.S.A.; Automatic Grinding of Bearings; Work Handling Within Machine Tools; Electronic Subunits Assembled Automatically.

Dairy Engineering.—Preview of the 70th Dairy Show at Olympia, London; Dairying in Brazil; Behind the Scenes of Butter and Cheese Grading; A New American Quick Cheesemaking Process.

World Crops.—Wheat-farming developments in Australia; Wheat Breeding and Production in Canada; The Snowy Mountains Scheme; Copra Production by the Smallholder.

Manufacturing Chemist.—Purification of Chemicals by Zone Melting; Recent Developments in Ion Exchange; Iodine as a Catalyst in Pharmaceutical Chemistry; Chesterford Research Station; Progress Reports: Hormones; Disinfectants; Perfumery and Essential Oils.

Corrosion Technology.—Corrosion of Stainless Steels in Supercritical Water; Fundamentals of Cathodic Protection; "Humid-Trol"—A New American Moisture Preserving Container; The Use of Hot Dip Strippable Coating for the Protection of Spares.

Fibres.—Synthetic Fibre Filters; Fibres for Brushmaking.

Textiles in Industry.—Special Issue: Protective Clothing.

Paint Manufacture.—Polyesters for Surface Coatings; Formulating Industrial Finishes, 2; The Hiding Power of White Pigments; An Analysis of Colour Preferences; Colour for Manufacturers; Testing Paints by Outdoor Exposure, 2.

Petroleum.—Fuel Investigation at Cranfield; Isobutane Production; Producing Higher Octane; Water Cooling Problems; Infra-red Absorption Analysis in the Petroleum Industry.

Chemical and Process Engineering.—Heat Transfer Media, 1; Chemical Engineering Review: Oils and Fats Processing; Press Selection for the Manufacture of Metal Containers; Manganese Dioxide for Primary Batteries; New Type of Solvent Contactor in the U.S.

Booklets Received

Covering "every corner of Britain from Land's End to the Shetlands," a light-hearted booklet recently issued by Brook Motors Ltd. gives an "artist's impression" of each of the cities in which the company's technical sales service is available, and introduces the men who operate it.

Conveyor belts of all types to carry heavy or light, large or small objects are the subject of a booklet issued by the Manufacturers Equipment Co. Ltd. The *Rapistan* belts described, are designed for use in many industries. Although they can be combined into a full-scale flow system, they are so constructed that they can easily be moved from one job to another.

A variety of machines for washing used or new bottles, vials, test tubes and hypodermic needle tubes are described by Thomas Hill Engineering Co. (Hull) Ltd., in a new series of leaflets. The latest addition to their range, the Grangemouth Hydro, is designed for dealing with bottles that need very careful washing. It provides for label removal and disposal.

A bulletin, *Escape from Fire*, recently issued by the Fire Protection Association, describes the principles governing the provision of fire separation in buildings, (*i.e.* doors at the head of stairs and in corridors, etc.) and indicates the requirements for exits. It also gives guidance on where detailed advice can be obtained on the legal aspects of fire safety or to meet specific problems. Copies of the bulletin can be obtained free on application to the association, 15, Queen Street, London, E.C.4.

Dairy lectures

Two series of advanced lectures on special aspects of dairy technology will be held at the Chelsea Polytechnic, London, on Tuesdays at 7·15 p.m. from November 13.

Symposia on antioxidants and peas

The following symposia will be held at the Low Temperature Research Station, Cambridge during 1957:

Antioxidants in Food. Organiser Dr. C. H. Lea; during April.

Maturation and Germination of Peas (in collaboration with the Fruit and Vegetable Canning and Quick Freezing Research Association, Chipping Campden). Organiser Dr. H. G. Wager; during June.

The Symposia will cover both scientific and technological aspects. Those interested are invited to communicate with the Superintendent, Low Temperature Research Station. Further particulars will be announced in due course.

Food News Overseas

Soya bean factory

A new factory for processing soya beans is being built by S.A. Moinhos Rio Grandenses, near Port Alegre, Brazil. It is expected to handle 50,000 tons of beans annually, manufacturing edible oil, margarine, soya flour and other products.

Enzyme production

The Hawaiian Pineapple Co. has started a limited commercial production of Bromelain, a protein-digesting enzyme derived from pineapple plants. The product has important industrial uses as well as possible medical applications, according to the company president, Mr. Henry White.

Mr. White said protein-digesting enzymes were used chiefly in the brewing, food and leather industries. Other possible uses were for tenderising meats, cleaning hides for tanning, making cheese and processing silk.

Turkish food distribution

A limited liability company with a capital of just over £2 million has been set up in Turkey to buy foodstuffs from the producer and sell them direct to the consumer with the object of reducing retail prices. The main shareholders of the company, "Gima" (Gida ve Ihtiyac Maddeleri Turk Anonim Sirketi), will be the Fish and Meat Office, the Soil Products Office, the sugar company, Migros-Turk, the municipalities of Ankara, Istanbul and Izmir, and a number of semi-state and private banks.

Insect attack on stored grain

There are at least 25 different species of insects which attack stored grain in South Africa, according to Dr. Bernard Smit of the Department of Agriculture, division of entomology. An emergency has risen in the Union because of a succession of record crops and the impossibility of exporting surplus maize. The problem is being investigated from all angles by the Maize Control Board which has formed a team of scientists in co-operation with the Department of Agriculture. Storage structures, fumigation problems, plant physiology and biological surveys of the insect are all being studied.

One of the most important control methods, according to Dr. Smit, is general hygiene. This includes scrupulous cleanliness in grain stores and elevators, cleaning lorries and railway trucks, isolation and fumigation of all infested grain, sterilisation of used bags, proper stacking and other precautions.

SOIL SCIENCE AND CHEESE

Three members of the Confrérie des Taste-Fromage, (an ancient society of cheese-tasters), in their picturesque green uniform with cocked hat, helped, with a large selection of their products, to welcome those taking part in the sixth International Congress of Soil Science held in Paris recently. The photo was taken at an evening reception given by the French Soil Science Society and the Duc de Luynes in the historic Château de Dampierre, the home of the Duc de Luynes.

Fish flour tests

According to the report of the Fish Consumption Committee, the Fishing Industry Research Institute, Cape Town, has produced from maasbankers a fish flour of a greyish colour but of high biological value. A 2% addition to bread and mealie meal would be odourless and tasteless. In fact, as much as 8% could be added to brown bread without detection. The colour of brown bread would not be affected adversely and the colour of white bread and mealie meal, with a 2% addition, would be altered so slightly that only the expert eye could detect it. Laboratory experiments have shown that a better flour from the colour aspect can be obtained from stockfish. However, this product would be much more expensive to produce and would demand a large capital outlay for the purchase of additional trawlers. At this stage, therefore, it was not considered practicable to introduce a white fish flour from stockfish as a food enriching medium.

Food factory for Brisbane

Construction has commenced on a £250,000 wheat processing factory for Sanitorium Health Food Co., at Moorooka, Brisbane, Queensland. It will have a floor area of 37,000 sq. ft. comprising an office block, main factory area, an amenities block and a four-storey block at the rear. Two silos are to be built. The foundations have been laid and it is hoped to have the building completed towards the end of next year.

Processed Queensland nuts

After ten years of experimenting, roasted and salted Queensland nut products are now on the market. The processing company claims that they are the first firm in Australia to process this type of nut. The Director of Horticulture in Queensland said that the Department of Agriculture was hoping to extend production of the nut from a backyard crop to an industry of commercial significance. The department has begun a programme of selecting and propagating better quality grafted stock from about 600 seedling trees in the Redland Bay, Nambour and Maryborough districts.

Fish culture in Malaya

The Fish Culture Research Institute and Training Centre which is being built in Malaya, near Malacca Airport at a cost of $51 million, is expected to be completed early next year. Ponds built for the institute cover 92 acres and vary in size from one-fortieth of an acre to 4¼ acres. The institute is a project of the Colonial Development Corporation.

Dairy plant

A plant is to be set up in Bangkok (Siam) shortly by an American private firm, to process recombined milk by adding water and butter fat to imported non-fat, dry-milk solids. The American company will work in close co-operation with Dairy Industries Society Inc., an international organisation which seeks to promote the drinking of milk.

Whale preservation

Two Norwegian whaling companies have been collaborating with an international pharmaceutical concern to test an antibiotic designed to arrest the process of decay in dead whales. The preparation is *Biostat*, developed by Charles Pfizer and Co., New York. It may be introduced into the body of the whale either by the harpoon shell or by an injection into the animal's stomach after it has been shot.

In a recent experiment, a whale treated with *Biostat* immediately after being killed was subjected to extensive analytical tests 48 hr. later. These tests are said to have shown that the decay process—usually well advanced in the beast's intestines after 36 hr. had not started. Both meat and oil were in perfect condition.

Grain elevators for India

India is negotiating with the U.S. for the erection of grain storage elevators in India, Mr. Abid Ali, Deputy Labour Minister, has told the House of the People.

He said the Indian Government had entered into an agreement with the U.S. Technical Co-operation Mission for the supply of two 10,000-ton elevators, and component parts had already arrived in India.

Fruit toffee

A process for preparing toffee from fruits such as bananas, jack fruit, guava, papaya and mango has been developed at the Central Food Technological Research Institute, Mysore. The toffee possesses the nutrients and other characteristics of non-fruit toffees, it is claimed. It also contains flavour and nutrient constituents of the fruit from which it is prepared.

At present, a hardened fruit confection with toffee texture is not available in India. The fruits required are grown extensively in India. The process developed by the Institute has been tested on a laboratory pilot plant. The equipment required is simple and easily available.

PRIZE-WINNING DISPLAY

The Australian food stand, designed by Richard Lonsdale-Hands Associates, was awarded a gold medal for exhibition display at the IKOFA International Food Fair in Munich recently. The stand was constructed in a colour scheme of pale blue, yellow and white. A full range of foods and wines was shown.

Tender beef research

The U.S. meat industry is seeking new ways to improve the tenderness of lower grades of beef as a means of reducing production costs.

Dr. B. S. Schweigert, assistant director of research and education of the American Meat Institution at Chicago, states that the Foundation, whose research by 55 scientists is supported by domestic and overseas meat packing companies, has an active beef tenderisation programme under way. It includes studies on tenderiser preparations and seeks to avoid the need for costly, wasteful procedure of heavy feeding of concentrates to beef cattle.

Meat to defeat rheumatism?

A high lean meat and fat diet cured his rheumatism, claims a 77-year-old Arctic explorer and scientist. Speaking at the golden anniversary meeting of the American Meat Institute recently, Vilhjalmur Stefansson reported that about three years ago he had noticed a gradual stiffening of his hip, knee and shoulder joints. On going back to his favourite Arctic diet of lean and fat in the ratio of a about 4 to 1, which provided about 20% of his calories from lean meat and 80% from fat, he noticed an improvement in his general health. He was overweight when he started, but with the meat diet and very high fat caloric meals, he lost about a pound a week. Later he noticed that his joints were no longer stiff and tender.

"There have been widespread statements about fat in the diet being responsible for cholesterol (which some doctors claim leads to atherosclerosis or coronary heart troubles)," continued Stefansson. "According to analyses recently made the cholesterol count of my blood is now within normal limits."

Synthetic amino acids

Synthetic amino acids could make a valuable contribution to national health and animal husbandry, Dr. Edgar Britten, Director of the research laboratory of the Dow Chemical Co., said at the Perkin Centennial meeting held in New York recently.

Dr. Britten said that these acids, which were essential food elements, awaited only large-scale production by synthetic processes to become cheap enough for general use.

"Eight of the amino acids found in good protein are essential for humans. Not one of these eight (if absent from the diet) can be synthesised by the human body in sufficient amounts to sustain life from any materials ordinary ingested," Dr. Britten said.

"If large production of these amino-acids were available, the chemical industry could probably supply all our daily requirements by feeding us about 80 g. of the mixture, and at large production prices this would not cost us more than a dollar," he added. "Supplementing cheap proteins by certain of these essential amino-acids should be considered just as necessary to animal husbandry and national health as it is to supplement our food with vitamins."

Packaging

Insulated bag for ice cream

An insulated bag which will keep ice cream in good condition for 1 hr. without refrigeration has been introduced by Lyons. It costs 2d. and can be used again and again. This will enable the housewife to buy ice cream with the rest of her shopping and take it home without worrying about it melting.

Standard wine bottles

Italian wine and vermouth producers agreed at a recent meeting to use a standard bottle. It will be easily identifiable, has a capacity of 99 to 101 c.c., and a mouth suitable to take a standard crown cap. Glass manufacturers will submit sample bottles before a final decision is reached on the actual shape and colour.

Pantomime pack

George Payne and Co. Ltd., have launched a special novelty composite pack. Called *Cinderella*, it contains one ½ lb. carton of *Poppet* milk chocolate assortment, and one 6d. carton of each of four varieties: *Ko-ketts, Mint-etts, Toff-etts and Fruit-etts*. It will retail at 3s. 6d.

When the chocolates have been eaten, the carton forms a brightly coloured pantomime stage, with the conductor poised ready to strike up the band. The reverse of the pack carries a scene from the pantomime which, when cut out and reversed, completes the Cinderella stage-set.

Quick frozen whiting

Cleaned, filleted and packed within 12 hr. of catching, Smedley's quick-frozen whiting comes to the housewife for the first time with its all-important flavour intact. Whiting is one of the first products of Smedley's new sea-front factory at Portavogie, Northern Ireland (*see* FOOD MANUFACTURE, June 1956, p. 244). It retails at 1s. 5d. per 8 oz. and 2s. 2½d. per 14 oz. pack.

Tying tapes

Industrial Tapes Ltd., manufacturers of the *Speedfix* range of self-adhesive tapes, have produced a new tying tape, *Speedline*, manufactured in $\frac{3}{16}$ in. or ¼ in. width.

The tape is fabricated from rayon fibres embedded in a ribbon of transparent coloured cellulose and samples tested proved to be extremely strong.

Speedline is put up on spools of 1,000 yd. ($\frac{3}{16}$ in. width) or 500 yd. (¼ in. width). It is supplied in four stock colours, red, blue, green and amber, but many other colours are available to special order. The tapes can be readily overprinted, the price at the middle quantity being only 2s. per thousand yd. addition.

Vacuum packing

Nuvec Products Ltd., makers of *En-Cor* Foods, have introduced a process for vacuum packing claimed to be new to Britain. They say that bacon and cooked meats packed in this way have a storage life of several weeks without refrigeration.

In view of the savings effected by the large scale processing of these goods, they hope that it will soon be possible to market vacuum packed goods at a nominal extra cost, which will cover the normal wastage of material in slicing.

The packaging equipment is now under construction to Nuvec's specification and the first series of British made vacuum packing machines will shortly be available.

Quick-frozen whiting from Smedley's new factory at Portavogie.

Christmas packs for hams

Viskase Ltd., have introduced a special seasonal design for their *Visking* ham casings. The design is printed in red and green, and a scarlet Christmas tree bauble with the words "Cooked Ham" is suspended from a sprig of holly by a bow carrying the message "Christmas Greetings." Below is a scroll on which the name and address of the individual processor can be printed. The whole stands out boldly against a background dotted with impressionistic Christmas trees in scarlet tubs.

The casing is transparent and shrinks closely on to the meat making it attractive to display. It does not have to be removed for slicing as the machine cuts through it easily. Thus the display value and hygienic protection is maintained throughout the time that the food remains on the counter.

Plastic-covered meat

The latest American idea for selling meat involves plastic coverings which come in two kinds: (1) where the meat is cooked by the housewife right in the plastic, (2) where the plastic is pulled off just before cooking.

The first system makes use of polyester film that covers the meat throughout cooking, one of the ideas being that the housewife has no dirty pans to clean. In the second system a colourless liquid coating of plastic is poured over the meat. It rapidly hardens and conforms perfectly to the shape of the meat.

Plastic tubes

John Dale Ltd., have acquired from Flexipac Ltd. the rights to manufacture in Great Britain, Canada and Switzerland, plastic collapsible tubes under the processes patented in those countries by the latter company.

Trade Marks

AIR CADET.—748,949. Sweetmeats made of marzipan; chocolates, toffees, caramels, chewing gum, marshmallow, cachous (confectionery), liquorice confectionery; pralines, fondants, nougat and fudge; gums being non-medicated confectionery; and non-medicated sugar confectionery in the form of cigarettes or tablets. **Paramount (Laboratories), Ltd.**, 15, Irving Street, Leicester Square, London, W.C.2.

AMERIPOP.—747,698. Corn for making popped corn. **Ackroyds (London), Ltd.**, 12, John Street, London, W.C.1.

BAROMETER.—753,419. Wines and spirits (beverages). **Garvey S.A. Bodegas de San Patricio**, Bodegas de San Patricio, Jerez-de-la-Frontera, Spain, and c/o Wildbore and Gibbons, 101, Leadenhall Street, London, E.C.3.

BELLE EAU PARK.—B749,149. Dead turkeys. **W. and J. B. Eastwood, Ltd.**, Belle Eau Park, Bilsthorpe, Notts.

BETA-FIRM.—753,497. Foodstuffs for animals. **V. W. Eves and Co., Ltd.**, Beta Works, Fowler Road, Hainault, Ilford, Essex.

BLUE JOYS.—743,452. Meat; fish, poultry and game, none being live; meat extracts; preserved, dried and cooked fruits and vegetables; and jellies (for food), jams, dairy products (for food), edible oils, edible fats and pickles. **S. Daniels and Co., Ltd.**, Oxford House, 15, Crosswall, London, E.C.3.

BOLERO.—753,646. Chocolate and confectionery (not medicated). **Caxton Chocolate Co., Ltd.**, Mayes Road, Wood Green, London, N.22.

BUZZBOMBS.—750,721. Bubble gum being chewing gum. **Marshall and Parker, Ltd.**, 8A, West Smithfield, London, E.C.1.

New Companies

R. N. Bollans and Co., Ltd. (569902.) 11-13, Victoria Street, Liverpool, 2. Produce brokers, fruiterers, bacon factors, etc. £20,000. Subs.: R. N. Bollans and J. A. Ross.

Daybern Co., Ltd. (569779.) 10, Broad Street, Cardiff. Ice cream makers and mchts., etc. £3,000. Dirs.: D. Berni and A. G. Davies.

Fin Fare Fisheries, Ltd. (569111.) Steamship, ship and smack owners, trawler managers; deep-sea fishers, etc. £20,000. Subs.: C. L. Wilbraham, Maple Lodge, Hardhorn Road, Poulton-le-Fylde, Lancs. (co. dir.) and F. Williams.

C. W. Firth and Co., Ltd. (569086.) 9, Spilman Street, Carmarthen. Mnfrs. and dlrs. in chocolate, sweets, confectioneries, etc. £2,000. Dirs.: C. W. Firth, T. J. Williams and J. Thomas.

G. Haywood (Midlands), Ltd. (569581.) Mnfrs. of and dlrs. in cattle foods and feeding preparations, etc. £2,000. Subs.: W. L. Dunn, Park House, Friar Lane, Nottingham (acct.) and W. D. Crane (solr.).

Joy to Eat Foods, Ltd. (569728.) Wholesalers and retailers of tinned foods, import and export mchts., etc. £1,000. Permt. dirs.: R. C. and Edna E. O. Dudley, 12, Harley Gardens, London, S.W.10.

Kendal Mint Cake, Ltd. (569221.) Fallbarrow, Bowness on Windermere, Westmorland. Mnfrs. of and dlrs. in confectionery, etc. £500. Permt. dirs.: J. B. Gilroy and N. Whiteley.

Langmeads of Flansham, Ltd. (569751.) Flansham House, Flansham, nr. Bognor Regis. Breeders, rearers and dlrs. in poultry, etc. £1,000. Permt. dirs.: J. H., I. M. and D. F. Langmead.

Model Bakery (Swanley), Ltd. (569316.) 31, St. James's Place, London, S.W.1. £100. Dirs.: F. C. Thomas and Mrs. B. E. Thomas.

Mortons Dairies, Ltd. (569854.) 187, Stanley Road, Bootle, Liverpool, 20. Mnfrs. of and dlrs. in condensed milk, milk powder, etc. £1,000. Dirs.: J. Morton and Mrs. S. K. Lancaster.

Newport Silos, Ltd. (569911.) The Silo, Newport, Salop. Grain drying and storing, corn and seed mchts., etc. £10,000. Subs.: Mrs. K. M Weller and J. Cass (solr.).

Pedley and Richards, Ltd. (569227.) 6, Rutter Street, Walsall, Staffs. Canners, bottlers, preservers and packers of fruit, vegetables, etc. £2,000. Dirs.: B. S. Pedley and C. T. Richards.

Seventh Heaven Products, Ltd. (569841.) 18, Rupert Street, London, W.1. Mnfrs. of and dlrs. in sweets, chocolates, confectionery, etc. £100. Subs.: S. Goodman and A. M. G. Gelardi.

R. Rowland Smith and Partners (London), Ltd. (569105.) Quadrex House, Park Lane, London, W.1. Fish and oyster mchts. and salesmen, etc. £2,000. Subs.: R. R. Smith and C. G. Pryse.

R. and L. Supplies (Eastcheap), Ltd. (569692.) 152, Fenchurch Street, London, E.C.3. Buyers, sellers, mnfrs. of and dlrs. in sauces, condiments, spices, starch, cheese, custard, etc. £100. Subs.: Alice E. Ranson and Mary Ledsham.

Sussex Stock Farms, Ltd. (569617.) £100. Subs.: Jean Herbert (co. dir.) and T. A. Herbert (barrister), 156, Strand, London, W.C.2.

Thomas and Dineley, Ltd. (569453.) 461, Hedon Road, Kingston-on-Hull. Importers and buyers and sellers of meat; butchers, etc. £498. Permt. dirs.: Florence A. Sharp, J. K. Smallwood and A. E. Dutton.

From Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C.2.

New Scottish Companies

Bell Heather Preserves Co., Ltd. Mnfrs. of and wholesale dlrs. in jams, jellies, preserves, sugar refiners, aerated water and ice cream mnfrs. Subs.: John McKinley and James Graham Milne, both of 69, St. Vincent Street, Glasgow.

Christies of Perth, Ltd. Kinnoull Bakery, Bridgend, Perth. Mnfrs. of and dlrs. in bread, cakes, biscuits, etc. £10,000. Subs.: Andrew and Josephine Christie.

R. Edwards (Central), Ltd. Sausage and cooked meat mnfrs. £2,000. Subs.: James Muir, 6, Graham Buildings, Halfway, Cambuslang, and W. V. Owen.

Finlip Products, Ltd. Makers of and dlrs. in tea, coffee, cocoa, etc. £100. Subs.: A. C. W. Reddell and G. M. Rhodes, both of 172, St. Vincent Street, Glasgow.

Highlander, Ltd. 19, City Road, Dundee. Dlrs. in essences, dyes, colouring and flavouring compounds. £5,000. Dirs.: Val Kosto and J. O. Pendrich.

T-Tapes, Ltd. 65, Church Street, Port Glasgow. Mnfrs. of and dlrs. in packaging equipment, sealing tape, boxes, cartons, etc. £100. Dir.: John R. Jeyes.

The Sweetie Shop (Kirkcaldy), Ltd. Mnfrs. of and dlrs. in confectionery, sweets, chocolate, etc. £10,000. Subs.: Elizabeth J. M. and John C. C. Wares, both of 18, Cowan Street, Kirkcaldy.

Alexander Waddell, Ltd. 47-49, Wesleyan Street, Glasgow. Mnfrs. of and dlrs. in cereals, grain, seeds, oils, etc. £40,000. Dirs.: William, Alex and A. B. Waddell.

Walker Machines (Glasgow), Ltd. 28, Princes Street, Port Glasgow. Mnfrs., dlrs., and to act as nominee or trustee for the sale of coffee vending machines and other types of slot machines. £100. Dir.: Elizabeth M. Walker.

Murray and Steven, Ltd. 5, Fitzroy Place, Sauchiehall Street, Glasgow. Consulting engineers and agents to the bakery, confectionery, chocolate and allied trades. £2,500. Dirs.: J. M. and J. D Murray, J. D. Steven and Jas. Sharp.

COMPANY MEETING

SCRIBBANS-KEMP

Battle of Rising Overheads

The 29th annual general meeting of Scribbans-Kemp Limited was held on October 11 in London, Mr. H. Oliver-King (chairman and managing-director) presiding.

The following is an extract from his circulated statement:

The profits of this Group are derived from four sources: cakes and biscuits, sugar confectionery, retail stores (sweet shops, grocery and delicatessen branches) and finally from overseas interests represented by flour confectionery manufactured in Montreal, Cape Town and Johannesburg. Shareholders will realise that the risks nowadays are very much more evenly spread over a number of enterprises than was originally the case.

Whilst the Group profit (£936,080 against £1,304,577) is down the turnover was up in each of the four branches. Factors which have added tremendously to the cost of operating are labour, packing materials, and the ever swelling cost of transport.

In March, 1957, it is hoped to open the very large extension to our Lincolnshire factory, where the biscuit manufacture will adopt the most modern technique available.

Prices have been held quite firmly and indeed there has been in the case of cakes a range of goods at an even lower price.

The export side of our business has increased considerably. In sterling areas our exports are up by over 10 per cent. and in dollar countries by over 50 per cent.

Up to the present moment turnover is being well maintained in every division of our activities, but there is this constant battle of rising overheads against stiff competition, and it may be that, if costs continue to rise, some adjustment in our selling prices may prove inevitable.

The report was adopted.

Information and Advice

This Service is available to subscribers to FOOD MANUFACTURE. If a stamped addressed envelope is enclosed replies will be sent by post, but enquiries cannot be answered by telephone.

Soup powders

B.7868. *Please supply information on the manufacture of soup powders.* (London, S.E.14)

Pre-cooked dried soup powder is prepared by:

(*a*) Cooking together fresh vegetables and meat.
(*b*) Converting the cooked mixture into a purée.
(*c*) Drying this purée on roller driers.

For further details consult the article "Dried Soup Powders," by J. C. Fidler *et al.*, in the August, 1945, issue of FOOD MANUFACTURE, pp. 277-281.

Apple storage for mincemeat

B.7878. *Can you please tell us the best means of storing apples for use in mincemeat?* (Glasgow)

Apples can be preserved for this purpose in sulphur dioxide. Good sour cooking apples are cleaned and filled into a cask. Use 5% solution of sulphur dioxide, the amount being about 2 fl. oz. to each gal. capacity of the cask. Fill the cask with water and close. Apples stored in this way can keep for 12 months and retain their colour. They can be peeled and cored on a machine.

Fish paste

B.7961. *Have you any information on the manufacture of fish paste?* (Victoria, Australia)

The following recipe is a basic formula for fish paste:

	lb.
White fish and canned salmon ..	70
Fat	5
Soya (full-fat and debittered) ..	7½
Fine semolina	2
Seasoning	1
Added water	14%

Mince the fish to a fine paste. Cook the semolina and soya separately in the added water. Then mix with other ingredients. Fill into jars and process the mixture at about 235°F. for 1 hr. The amounts of individual fish may be varied to suit local tastes and regulations.

Marzipan

B.7964. *Please let us have a recipe for making marzipan. As the present cost of ground almonds is so high, can ground peanuts be used as a substitute?* (Castledermot, Ireland)

The following recipe for making marzipan is given in *Food Industries Manual* (Leonard Hill, London).

Granulated sugar	60	lb.
Corn syrup	14	,,
Ground almonds	30	,,
Fondant	14	,,
Glycerin	4	fl. oz.
Almond oil	½	,,

Sort, blanch and refine the almonds and place in a U-shaped mixing machine. Cook the sugar and corn syrup in a steam pan to 250°F. Pour the cooked batch on to the ground almonds, and add the fondant and glycerin. Mix thoroughly, then cool the batch and pass through refiner.

Then roll the marzipan into sheets of the desired thickness, cut into bars and crystallise. Alternatively, work the paste into mosaic patterns, draw out like boiled sugar batches into variously-shaped rods and cut into pieces on a guillotine. Crystallise in syrup at 34° Baume for 6 hr.

An inferior almond paste can be made by substituting peach or apricot kernels for almonds and flavouring them with almond oil. Ground peanuts are sometimes sold as a cheap substitute for almonds, but we have not heard of them being used for making marzipan. It must be borne in mind that first-class confectionery cannot be produced with substitutes.

Information supplied

The Enquiry Service has dealt with requests for names of manufacturers and suppliers of plant, machinery and materials, and also general information as follows:

B.7894. *Canning peas.* (Pewsey, Wilts.)
B.7895. *Making chocolate couverture.* (Kingston, Jamaica)
B.7896. *Manufacturers of machines for making potato crisps.* (London, N.W.10)
B.7897. *Canning meat.* (Bradford, Yorks.)
B.7900. *Suppliers of cheese flavours.* (Manchester)
B.7901. *Advice on firms to contact for export agency.* (London, E.C.3)
B.7903. *Grinding cereals.* (Beira, Portugal)
B.7906. *Manufacture of margarine.* (London. W.4)
B.7907. *Recipe for Milan cake.* (London, S.E.1)
B.7908. *Recipe for lemon curd.* (Clifton, Lancs.)
B.7909. *Advice on sweetening agent for sweets.* (Paris)
B.7910. *Address of makers of sausage rotor chopper.* (Liverpool)
B.7911. *Recipe for tomato drink.* (Ballymena)
B.7912. *Information on bottling mussels.* (Bristol)
B.7913. *Name of makers of vacuum packing machine.* (Market Harborough, Leics.)
B.7915. *Names of makers of essences for food industry.* (Frankfurt)
B.7916. *Literature on making piping jelly.* (London, E.C.2)
B.7917. *Information on making minced chicken.* (Stavanger, Norway)
B.7918. *Suppliers of machine for cleaning dies.* (Victoria, Australia)
B.7919. *Address of producers of melon flavour.* (Israel)
B.7920. *Information on bottling turkey.* (Rye, Kent)

Recent Patents

COMPLETE SPECIFICATIONS ACCEPTED

752,582. N.V. KONINKLIJKE NEDERLANDSCHE ZOUTINDUSTRIE: Process for reducing the caking tendency of sodium chloride.

757,960. ARMOUR AND CO.: Animal feeding stuffs.

757,682. P. CARPIGIANI: Motor-driven ice-cream freezers.

758,511. BRAUNSCHWEIGISCHE MASCHINEN-BAUANSTALT A.G.: Process for the purification of sugar juices.

758,347. J. G. and A. H. CORYN: Machines for grading apples or the like.

758,349. ARENCO, LTD., and J. D. NIXON: Apparatus for packaging flour and like material.

758,265. J. E. CRUIKSHANK: Apparatus for use in the manufacture of potato crisps.

758,284. LURGI GES. FÜR WARMETECHNIK GES. and RUHRCHEMIE A.G.: Method of and apparatus for treating cereals.

758,504. MIKROVAERK AKTIESELSKAB: Delivery arrangement in plants for moulding chocolate and similar confectionery.

758,613. O. and A. RUSCHIG: Method of making chocolate products with piece fillings.

758,712. M. BAILLY: Neutralisation of caffeine in coffee.

759,051. S. COLLINSON: Diaphragm pumps for milk.

758,965. N. STODDART: Baking cases or like paper containers for cake mixtures.

ABSTRACTS OF BRITISH PATENTS

Baked and/or toasted cereal

Coconut oil in quantity 0·1-12% by wt. is incorporated in an oats-containing cereal product to prevent the formation of bitter substances from the oats during storage. — 751,122. *P.O. Stokkebyes Kvarnaktiebolag.*

Lobster broiler

A lobster or its tail is longitudinally sliced and secured by spring members in a double U-shaped container with a sliced portion in each part, so as to prevent tail-curl, etc.—751,563. *W. Trunk.*

Ion-exchange treatment of wines

An ion-exchange treatment of wines, fruit juices, etc., where provision is made for automatically changing the contact time between the liquid and the exchanger. — 751,252. *Delmousee and Cie.*

Curing meat

A method of curing meat in which a complex Ca lactate ion (resulting from the reaction of lactic acid and Ca lactate in aqueous solution) is introduced into the curing solution to accelerate the process. —751,255. *R. H. Starr.*

Synthetic pepper

A composition comprising a pepper base including a pungent material (*e.g.* piperine, chavicine, etc.), a resin, a carrier and a synthetic flavour of ⅄ one of the following types: woody (*e.g.* sandalwood oil), aromatic (*e.g.* vanillin), citrus (*e.g.* citral), phenolic (*e.g.* eugenol), floral (*e.g.* nerol), and putrid (*e.g.* skatole).—751,476. *T. Hasselstrom et al.*

Coffee-making device

A filter for coffee powder is carried at the lower end of a cylinder surrounded by a fluid-tight shell which defines a jacket in communication with a chamber containing an electric heater. The heater is controlled by a thermostat against which a water inlet nozzle is directed.—751,687. *Brevetti Gaggia S.r.l.*

Shrimp de-shelling machine

A portion of a conveyor receives a shrimp which is slit along its dorsal side with its ventral side outwards, and a squeezing device parallel to the conveyor portion receives and grips the ventral side of the shrimp.—751,822. *Alpha Shrimp Machine Corp.*

Poultry plucker

Co-operating plucking rollers each have a helical groove(s) and are so shaped, etc., that a few flight or tail feathers can be engaged between them at a time.—751,880. *Cope, Whelon and Co., Ltd.*

Beverage

A prepared mixture of alcoholic spirit and sweetening material is added to heat-treated milk, and the final mixture is sealed in bottles, etc., and further heat-treated.—751,900. *Mortlock's Modern Dairies, Ltd.*

Whale oil, etc., separation

Oil contained in glue-water overflow-separated from cooking liquid is subjected to a breaking treatment and returned to the inlet of the separating plant.—752,052. *A.B. Separator.*

Ice cream cone

A hollow portion which depends from a cup-like portion presents two or more adjacent limbs.—750,446. *A. Askey.*

Baking tin

In B.P. 750,475 tin composition layers bonded co-extensively to the inner and outer surfaces of a steel baking pan comprise an iron-tin alloy inner portion of 10-15 micro-in. thickness, an intermediate portion of free tin, and an outer portion of opaque olive-green tin oxide of 7-30 micro-in. thickness. *Cf.* B.P. 717,912 and 720,297.—750,473 and 750,474. *Ekco Products Co.*

Foodstuffs

A mixture of dry powder, made from starch-containing tubers, and water (without addition of fresh tubers) of water content ⅄ 35% by wt., is pressed into a tough to hard mass. Preferably the mass is then cut into strips, dried to a water content of ⅄ 10% and fried in hot oil for 3-13 sec.—750,217. *Nibb-it Products Association S.A.*

Margarine

Margarine is pasteurised without prejudicial separation using an oil-in-water dispersion of the main components containing ⅃ 16% water, which emulsion, immediately after pasteurisation is reconverted to a water-in-oil emulsion by working on cooling means.—753,040. *Rootry Esploitatie Mij. N.V.*

Vitaminised confectionery

The vitamins contained in yeast are incorporated in sweets by making a core of heat processed sugar, liquid glucose, dried yeast and water, and enveloping this with an outer covering of heat- and vacuum-processed sugar, liquid glucose, water and flavouring essence.—748,619. *K.C.P., Ltd.*

Sweet manufacture

Gums, etc., are prepared by heating an aqueous slurry of sugar and starch (of correct ultimate water content) above the B.P. of the slurry in a super-atmospheric pressure, holding it at such temperature until the starch is cooked, rapidly cooling the slurry and forming the gums from the product.—752,661. *National Cylinder Gas Co.*

Preserving milk

Milk sterilised by heating is bottled and sealed (at a sterile temperature) before cooking.—752,680. *W. Bohm et al.*

Citrous fruit liquor, etc.

Aromatic oils are extracted by puncturing, etc., the surface of the skin of cut fruit simultaneously with the reaming out of the fruit cells while the fruit is immersed in water or syrup.—751,766. *Northern Dairy Engineers, Ltd.*

Biscuit manufacture

Co-operating projections and depressions in respective mould plates have side walls inclined at different angles.—751,948. *L. Marsden.*

Chocolate moulding machine

Hollow bodies (*e.g.* Easter eggs) are formed in two-part moulds, a fin of chocolate being left projecting from each half-mould. The fin portions are partially melted, by heating, so as to provide the necessary attachment between the two chocolate shells.—752,478. *K. C. S. Aasted.*

Manufacture of sausages, etc.

In an apportioning machine for sausage filling, etc., a position of rest after a twisting operation is obtained through a crank drive, etc., which provides reciprocation. The motion in one direction is used for effecting twisting, and the twisting nozzle is at rest during the return motion.—752,502. *A. Handtmann.*

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The author's experience began at the age of twenty when he was appointed manager of coffee estates in Uganda. He was directly connected with the formation of the Kilimanjaro Native Planters' Association, now the K.N.C.U. In connection with his botanical collecting work for Kew and the British Museum he was elected a Fellow of the Linnean Society in 1928, and later, in 1930, he took charge of an Agricultural Training School. He now contributes to many journals at home and overseas, and has written several books on fibres.

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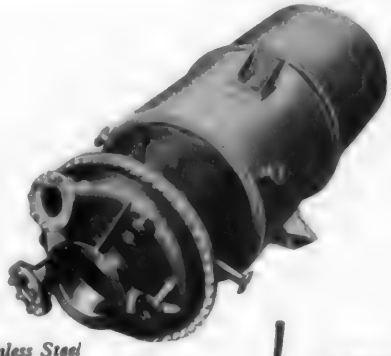

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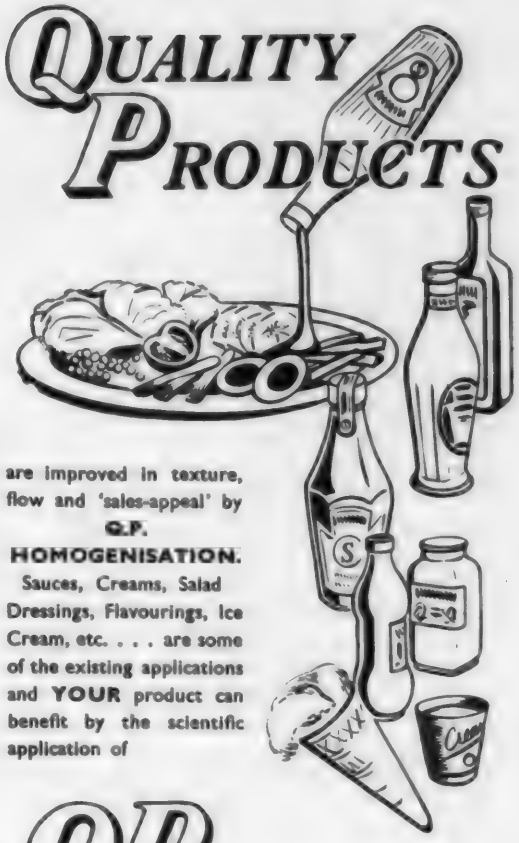

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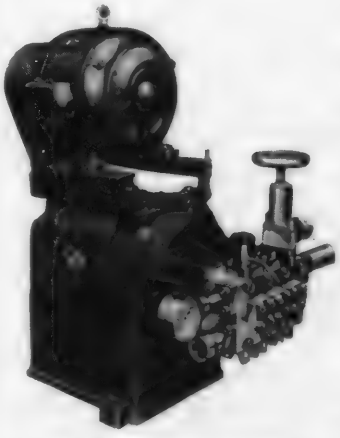

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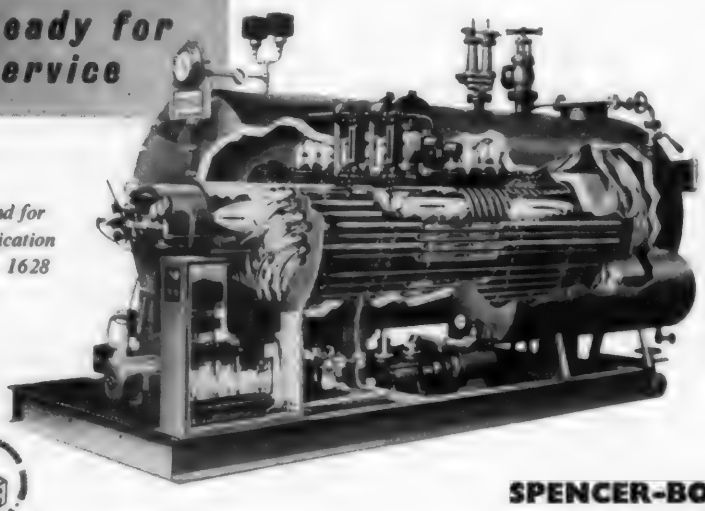

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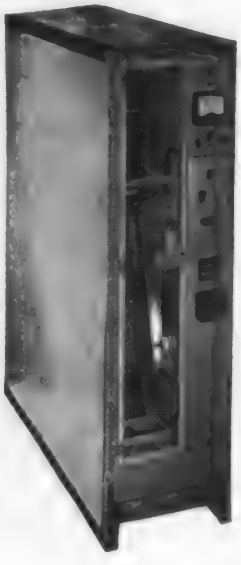

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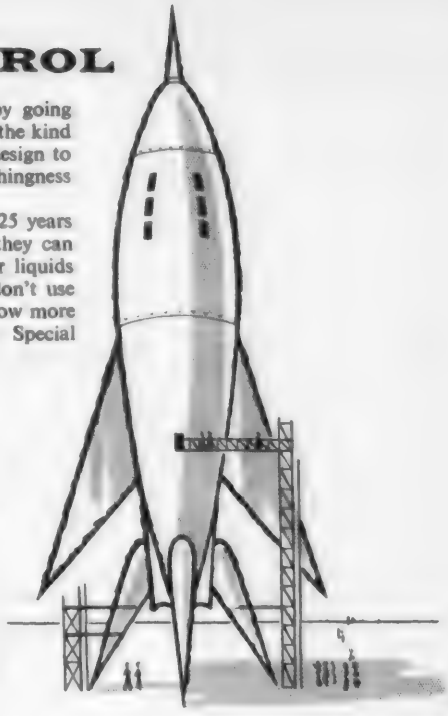

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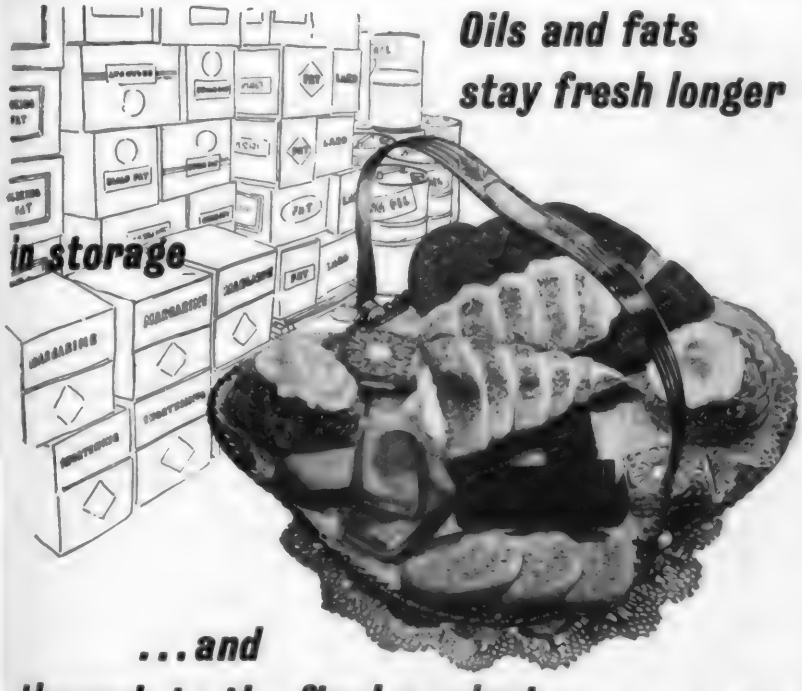

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...and through to the final product

Rancidity, and other signs of deterioration caused by exposure to light and air, can be easily inhibited in a wide range of foodstuffs by the use of 'Embanox'.

Here is a summary of the product's main properties:—

★ non-toxic ★ has little effect on colour, flavour, or odour of goods ★ very soluble in fats (up to 30 per cent in lard) ★ easily incorporated ★ effective at extremely low concentrations ★ effect persists through baking and frying, so that final products are protected.

The use of BHA as a food additive, alone or in association with other preservatives, has been approved in a number of countries, including Austria, Canada, Denmark, Finland, Norway, South Africa, Sweden, Switzerland and the United States. The detailed regulations vary from country to country: the current position should therefore always be checked by reference to the appropriate authorities.
Under existing U.K. food regulations, BHA may not be included in food for human consumption within the U.K. Recommendations for its approval have, however, been made by a sub-committee of the Food Standards Committee, and these are given in H.M. Stationery Office Publication (1954), "Food Standards Committee Report on Antioxidants: Revised Recommendations relating to the use of Antioxidants in Foods".

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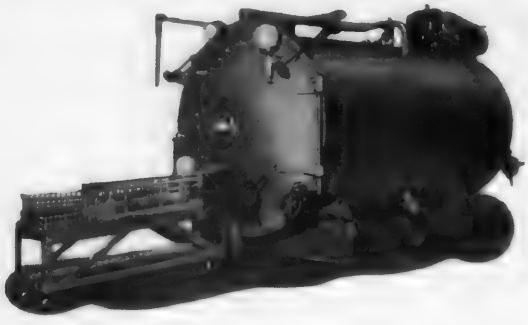

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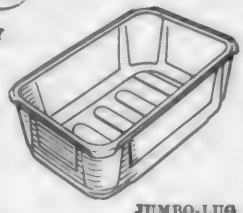
23½" × 14½ effective depth 7½". Weight: 8 lb. Equipped with nesting stops.



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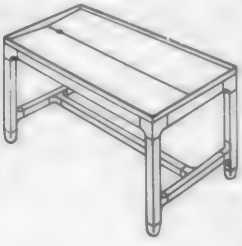

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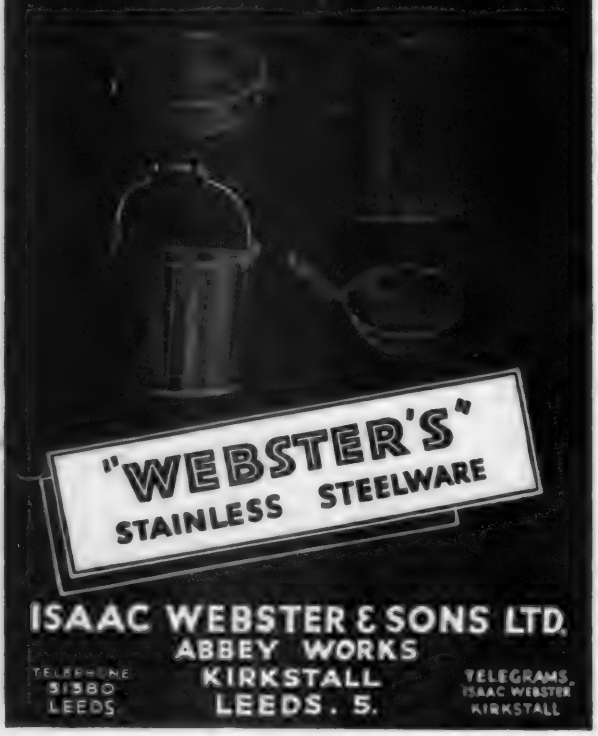

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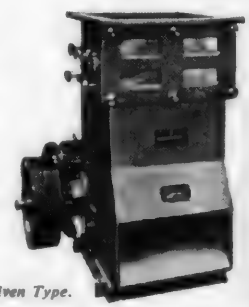

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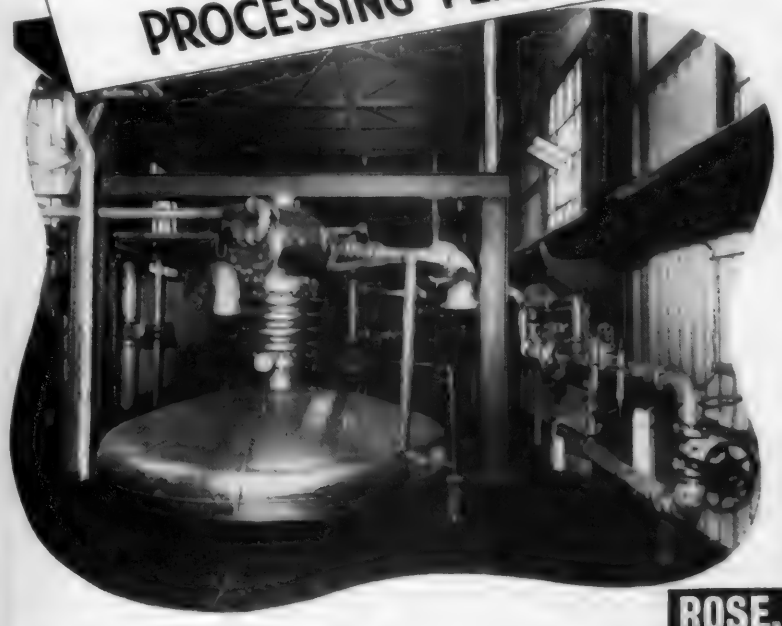

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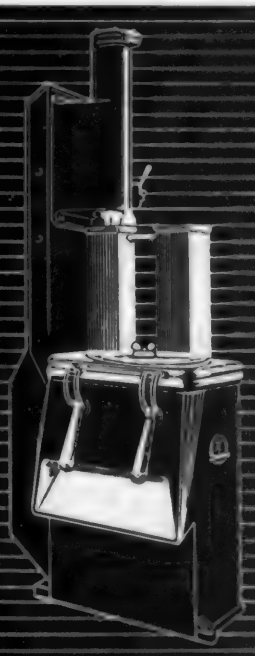

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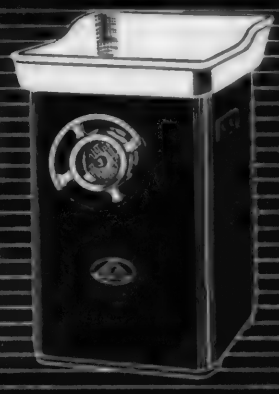

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BACTERIOLOGIST, Large commercial organisation dealing mainly with animal products has vacancy for qualified Bacteriologist to take charge of department in North London Research Laboratories. Permanent position with good prospects and non-contributory Pension Scheme.—Write giving age and details of qualifications and experience to Box B5389.

ASSISTANT Factory Manager required by old-established and progressive firm of Meat Canners in North London. Good Salary. Permanent position with good prospects.—Applications with full details of age, education, qualifications and experience should be addressed to the Managing Director, Harvey's Belgravia Foods Ltd., Belgravia Works, Marlborough Road, London, N.19.

DEPUTY Works Engineer required by Reckitt and Colman Ltd., for their main Food Factory at Norwich. Duties will cover factory planning, construction and equipment and the maintenance of buildings and a wide variety of modern automatic process and packing plant, together with all factory services. Applications are invited from Engineers aged 27 to 40, holding University Degree or equivalent, and having sound practical training and experience and the ability to control a Drawing Office Staff and a large labour force comprising all trades. Contributory Pension Scheme and Profit Sharing. Housing assistance can be considered.—Reply in confidence with full details of age, education, training and experience and stating salary required to: Secretary, Reckitt and Colman Ltd., Carrow Works, Norwich, Norfolk.

MELTIS Ltd., chocolate and confectionery manufacturers, require a Chief Chemist to take charge of the Laboratory. This is a good opportunity in an expanding business for an applicant with experience of chocolate and confectionery or allied food industry. The work comprises control of materials and products, factory investigations and research problems. A new Laboratory of a considerably larger size has recently been constructed. Five day week. Consideration might be given to assistance with housing.—Write in confidence, giving full details of present position, experience, qualifications and salary required, to the Technical Manager, Meltis Ltd., Miller Road, Bedford.

FACTORY SUPERINTENDENT FOR NEW ZEALAND. An expanding New Zealand fruit processing company situated in Christchurch requires a factory superintendent with full knowledge of processing of candied peel, cherries, ginger, etc. Excellent prospects with good salary and bonuses and shareholding interest.—Write full particulars of age, experience, etc., in confidence to Box B5378.

MILK Products Technical Representative. A Technical Representative is required by a member of the Fison Group of Companies, Fisons Milk Products Ltd., Loughborough, manufacturers of bulk and proprietary milk products. Applicants should be food technologists or have other relevant technical education and background. Some commercial experience preferred. The representative will be responsible to the Marketing Manager and will operate from Loughborough with journeys throughout the U.K. as required. This appointment offers sound prospects, is well remunerated and superannuated.—Full details of age, education and experience should be addressed to the Personnel Officer, Fisons Milk Products Ltd., Derby Road, Loughborough, Leics. Please quote reference 10.

A SENIOR Chemist is required to fill an existing vacancy in the flavouring department of an old established London Company with several Associated factories and laboratories abroad. The post offers wide scope to a man fully experienced in the formulation of flavouring essences, compounds, and concentrates of the Beverage, Confectionery and Food Industries.—Applications invited in strict confidence giving full details of experience and qualifications to Managing Director, Box PP60615, Samson Clark, 57/61, Mortimer St., London, W.1.

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DUE to continuing expansion, we are now able to offer a position to a first-class young man who has completed his national service. The post is of a trainee managerial nature within the factory, and previous general engineering or cereal milling experience will be considered a definite advantage. Written detailed applications are invited from those men who have a sound educational background, and who have the desire and the ability to work for a senior managerial post.—Please reply to Personnel Manager (CM.117), Quaker Oats Ltd., Bridge Road, Southall, Middlesex.

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To supervise
ORIGINAL DESIGN

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WELL-KNOWN Preserve Manufacturers require Chemist experienced in jam and marmalade manufacture for quality control and development work in factory near London (Home Counties). Please write stating experience and salary required.—Box B5355.

SITUATIONS WANTED

FOOD Chemist, B.Sc., 14 years industrial experience of wide range of food products and 7 years as senior executive requires managerial or equally responsible post, where his ingenuity and ability will be appreciated any area.—Box B5370.

CHARTERED Accountant, aged 30, with extensive knowledge of food manufacturing, including costing, financial and sales management, seeks position as Accountant.—Box B5382.

AUCTION SALES

AUCTION, November 13, 1956, at 4 p.m., at City Auction Hall, 58, Coleman Street, E.C.2. Fine Modern Factory, Sunbury-on-Thames, Freehold. All Ground Floor—floor area, 21,300 sq. ft. Vacant Possession.—Particulars Chamberlain and Willows, Auctioneers, 23, Moorgate, E.C.2. Tel.: MET 8001.

OUTSTANDING AUCTION OF MODERN CANNING PLANT, EQUIPMENT, MACHINERY, OFFICE FURNISHINGS, MOTOR VEHICLES, LABORATORY EQUIPMENT, ETC., AT
CANNED PRODUCTS LTD.
BALLYFERMOT HILL, CHAPELIZOD
DUBLIN
on Wednesday, November 14, and following days at 11 a.m. each day
Per instructions of Receiver, Alan Mathews, F.S.A.A.
Four American Canning Lines (two complete) capable of High-Speed Production, and comprising:
(1) Fruit and Vegetable Packing Conveyor, Syruper, 40 ft. Steam Exhauster, Can Runways, Pyrex Supply Line, Can Washer, Electric Motors, Starters and Switchgear.
(2) Syruper and Single-run Exhauster, Can Washer, Pyrex Tubing, Electric Motors, Starters and Switch gear.
(3) Six Pea Soaking Tanks, with flume and delivery chute to Vegetable Blancher, Olney Pea Washer, Pea Inspection Belt, 1 M.C. Pea and Bean Filter, "Angelus" 26P four-head Seamer, with change parts; Can Washer, Can Runways, Pyrex Tubing, Gooseneck Elevator, Electric Motors, Starters and Switchgear.
(4) Complete Meat Canning Line, with heavy duty "Alexanderwerk" Mincer, "Crypto" Mincers, Vacuum Meat-filling Plant, Vacuum Pumps, Packing Conveyor, "Angelus" 29v four-heat Vacuum Seamer, "Angelus" 26P four-head Clincher, "Ingersoll Rand" Vacuum Pump Unit, "Premier" Filter Press, semi-automatic Seamer, Can Washer, Electric Motors, Starters and Switchgear.
Together with: General Cannery Plant and Equipment, Boiler Plant, Dry Packing Plant, Workshop Equipment, Miscellaneous Equipment, Refrigeration Plant, Canteen Equipment, Office Furnishings, Motor Vehicles, Laboratory Equipment, etc.
Catalogue in course of preparation, price 3s. 6d. View, Saturday 10th, Monday 12th, and Tuesday, 13th November, from 10 a.m. to 5 p.m. Terms: Cash and 5% Commission.
JAMES H. NORTH & CO. LTD., M.I.A.A. Auctioneers, 110 Grafton Street, Dublin. Tel.: 74721/2/3 (3 lines) Established 1829. London Office: 20, Piccadilly, W.1. Tel.: REGent 3759, also at New York.

BUSINESS FOR SALE

For Sale, Republic of Ireland, Bacon Factory, as going concern. Killing and chilling capacity 1,500 pigs weekly. Recently modernised. Selling out owing to bereavement.—For further particulars apply Box B5383.

BUSINESS OPPORTUNITIES

THE Proprietor of British Patent No. 676,369 for *Improvements in Method of Treating Food Products*, desires to enter into negotiations with a firm or firms for the sale of the patent or for the grant of licences thereunder.—Further particulars may be obtained from Marks and Clerk, 57 and 58, Lincoln's Inn Fields, London, W.C.2.

DEPARTMENT OF PUBLIC HEALTH
BRISTOL

Health Committee invite quotations for purchase of following by-products from Public Abattoir, Gordon Road, Whitehall, Bristol, 5: Cattle Caul Fat, Sheep Caul Fat, Cattle Gut Fat, Rough Fat. Buyer to be responsible for collection and transport.—Other conditions of tender, etc., obtainable on application from the Medical Officer of Health, Central Health Clinic, Tower Hill, Bristol, 2.

COMPANY with Processing Facilities, Extruding, Mixing, Packing, etc., desires to contact firm requiring continuous tonnage of semi-finished materials or bulk products.—Box B5373.

KIBBLED Onions (large stocks) available with Specialised Packed Food Business. Very substantial turnover for many years.—Box B5375.

CONTRACT Pulverising. Quotations given for grinding of all types of chemicals, colours and foodstuffs.—KEK Ltd., Contract Pulverising Division, Palmerston Street, Ancoats, Manchester, 12. Tel.: Ardwick 1104/5.

ATTRACTIVE offer and/or position open to owner/s of small flavouring essence Manufacturing concern willing to operate on Royalty/commission basis with well established manufacturers.—First letter in confidence to George A. Touche and Co., Chartered Accountants, Suffolk House, Laurence Pountney Hill, London, E.C.4.

QUICK Frozen Food Processors and Distributors in S. London area have approximately 5 tons spare Freezing Capacity available weekly to quick freeze appropriate ready-packed food for reputable Food Manufacturers.—Write in confidence, Box B5391.

250,000 brand new, still in manufacturer's cartons, 1 lb. and 2 lb. Aluminium Pudding Basins, lacquered inside. No reasonable offer refused.—Box B5334.

80,000 2 lb. Circular Tins complete with tops laquered inside, brand new, still packed in manufacturer's cartons. No reasonable offer refused.—B5335.

MOISTURE Testing takes 3 minutes with the "Speedy" Moisture Tester. Works without electricity or skilled labour. Determines moisture content of all food ingredients. Portable, inexpensive, £27 10s. complete. Send for free illustrated leaflet.—Dept. FM.4, Thomas Ashworth and Co. Ltd., Vulcan Works, Burnley, Lancs.

FULL Steam in five minutes with B. and A. Electrode Boilers, used by British industries for twenty years. No boilerhouse, no flue, no attendant needed. The most compact and convenient steam raisers available, can go beside machines using the steam.—Write for Leaflet 125, Bastian and Allen Ltd., Ferndale Terrace, Harrow, Middlesex.

DE-GREASING and Cleaning Down. One man can do the work of five with B. and A. steam-cleaning-with-detergent equipment; ready for use from your own steam supply. "Speedylectric" high-efficiency steam lance; 30 ft. steam hose; 15 ft. detergent hose; £44 complete. Ideal for the Food industry.—Hyzone Ltd., 2 Rosslyn Crescent, Harrow, Middlesex. Leaflet L.

WELL-KNOWN Scottish Pie Makers can offer attractive terms to Agents with own transport. Goods despatched to any part of the country by passenger train. Branded line, goods packed in cardboard cartons, each containing one dozen.—Trade inquiries to V. C. Pies Ltd., Glasgow. Tel.: Maryhill 1048.

PLANT FOR SALE

FOR disposal a quantity of Canning Plant and Machinery now lying in London comprising: Nine-DS Double Seamer-type (Troyer Fox) patt. used spares-chucks-roll pins-seaming Rolls; one set No. 2 parts for 9-DS Seamer, sundry guides; three sets of change parts for 9-DS Seamer; 300 208 A2½-A1T; Maxams Double Seamer 168c spare parts, six seaming heads and rolls; Cherry Burrell G.16/16-head rotary syrup filler base guides-turrets-spare-parts tank and valves assem. complete for Rotary Syrup Filler; Can Unscrambler for No. 1 cans; No. 1 Can Elevator to labelling m/c. from unscrambler; straight through Syruper and parts; one Carton Casing M/c. for No. 1 cans; one Beth Labeller for round cans complete with spare parts, belts and guides; two Can Reformers (MB. Co.); two 4 in. Rubber Rollers; one 4 in. Nose; one 4 in. standard steel Roller; one 4 in. Flange Guard; one 4 in. standard Roller and Nose; one metal box horizontal power Flanger FMB 104, with box containing parts and five sets of chucks; four Rubber Rollers; four standard Noses; 18 Rollers, bearings; IM.N.I. Seamer, six rubber rollers; three flange rectifiers, plate and chucks; MBI parts, six chucks and spacers, washers, four roll pins and bearings and three seaming rolls; IMBTA hand Flanger No. 328, with box containing 211-300-301-307-401 and 607 chucks, 404 chucks on m/c.; one 60 gal. Boiling Pan, B.C. and H.; two 60 gal. s/s jacketed Soup Kettles; Empty Can Elevator (MB. Co.), runways, can twists, can steriliser, filled can washer, sundry iron can runways; large copper steam jacketed tilted Revolving Pan, 40 w.p.; Stand for copper-jacketed revolving Pan; one No. 00 Reeves Variable Speed gear (less belt); one Knapp round can Labelling M/c. (wants adjusting); Flash Pasteuriser, 50 g.p.m., with all controls; small hand Sausage Filler; Bowl Chopper and Mincer; Anderson, U.S.A., twin-head Shredding Machine Base for coconut shredding machine, large capacity; Pineapple Shredder; Filter Plates; one Can Twist for No. 1 cans; small Can Washer; 100-gal. open-top Square Tanks, glass-lined with side outlet at base; one box Shell Heaters; one ¾ in. geared s.s. Syrup Pump; one 1½ in. Tri-Clover Sanitary Pump, sundry lengths 1½ in. sanitary tube and used fittings, all stainless steel; one No. 3 Foote Enclosed Reduction Gear, 60-1; one Waukesha stainless steel Sanitary Pump (P.30), size 30; one 4 in. Steel Pulley; two Computing Scales (U.S. Slicing M/c. Co.); five Vandome Hart "Exact Weight" Platform Scales; four pr. 1 lb. "Exact Weight" Scales; four Paper Tape Sealing Machines; three Rototherm 60 min. Time Clocks; three sets Brass Scale Weights, ½-16 oz., one 1 lb., one 2 lb. scale weights; one Enumerator (ENM); one portable Paint Spray Plant Equipment, hose, guns, used stocks and dies; one steel Strapping Machine; two boxes Clipper Belting Fasteners; three used Veeder Root Can Counters; one Air Compressor and Tank; one set Pipe Stocks and Dies; three lengths used Balata Belting; one Atlas Lathe, 6 in. by 3 in.; one bench belt-drive Polishing Head; one ½ in. Bench Drill; one drum Lump Glue for labelling m/c.; four drums Beth Lap Paste for labelling m/cs.; one stock card Filing Cabinet; 50 gal. Silicate Soda; Stencil Cutting M/c. Most of the items available or whole can be inspected by appointment.—Offers invited for all or any by London Agency, Bahama Food Products Ltd., 82/90, Seymour Place, London, W.1. Tel.: PADdington 3456.

FOR Sale at attractive prices: three 100-gal. stainless steel Fruit Pulping Steamers, by B.C.H. One Sugar or Juice Filterpress and Receiver. One A.P.V. Rotary Jam Cooler. Two Potato Peelers, B.C.H., motorised. One 100-gal. stainless steel Peel Cooker, tipping by B.C.H. One 300-gal. Rectangular stainless steel Tank. All excellent condition.—Box B5281.

250- and 500-gal. stainless steel Tanks with agitators. Stainless steel interior Milk Cooling or Cream Ripening Vat with tubular agitator. Pasteuriser. Benhil Butter and Margarine Packer. Southall and Smith 2 lb. automatic Flour Weighing Machine. Mixers, Kneaders, Ovens, Racks, Provers, etc. Your enquiries welcomed.—Sorensen Bakery Equipment Ltd., 42, Raby Street, Manchester, 16. Tel.: Moss Side 2054. Grams: Rahbek.

PLANT FOR SALE

FOUR double-deck "Peerless" Electric Ovens with heated Prover underneath. Wired for 4-wire, 3-phase, electric supply. Will sell separately, reasonable offer.—Apply College of Technology, Bakery, Rosebery Building, Severn Street, Birmingham.

LITTLE-USED Baker Perkins No. 17 Universal Vacuum Mixer, 176 gal capacity, steam jacketed 60 lb. pressure. Complete vacuum pump and gearbox drive.—George Cohen Sons and Co. Ltd., Wood Lane, London, W.12. Tel.: Shepherds Bush 2070, and Stanningley, Nr. Leeds. Tel.: Pudsey 2241.

PAXMAN Economic steam Boiler, 14 ft. by 7½ ft., brick-set, turbine furnace, 5/6,000-lb. evaporation, 120 lb. pressure. Gas-fired steam Boiler, 4 ft. 6 in. by 18 in. diam., 100 lb. pressure. Gravity Conveyors, rollers 24 in., 18 in., 14 in. and 12 in. wide. Small power, twin-feed electric Potato Crisping Machines. 40-gal., copper jacketed, steam Tilting Pans.—A. H. Kimmins and Sons Ltd., Lyndhurst Road, Worthing.

THREE Albro, vacuum operated, Mincemeat Filling Machines, all of stainless steel construction with bulk filling hoppers; capacity approx. twenty-five 1-lb. jars per minute and complete with self-motorised vacuum pumps. New condition. Alite compression-type Mincemeat Filling Machine in stainless steel. B.C.H. gunmetal-lined Mincemeat Mixing Machine.—Full details from C. Skerman and Sons Ltd., 118, Putney Bridge Road, London, S.W.15. Tel.: Vandyke 2406.

TEN Thompson, stainless steel, steam jacketed, Boiling Pans, approx. 75-gal. capacity, size 30 in. by 27 in. deep, suitable 20 lb. s.w.p. Six Pfaudler, glass-lined, steam jacketed, Boiling Pans, approx. 60 gal., capacity size 29 in. diam. by 26 in. deep, with mild steel jackets for 75 lb. per square inch s.w.p.—Full details C. Skerman and Sons Ltd., 118, Putney Bridge Road, London, S.W.15. Tel.: Vandyke 2406.

B.C.H. "Speedy" Continuous Peel Cutting Machine with stainless steel working parts and motor drive. Turnbull Peel Chipping Machines. Full details from Box B5384.

ALBRO four-head, stainless steel, vacuum Liquid Filling Machine with rise and fall bottle platforms, etc., 11 ft. 6 in. long belt conveyor with 8 in. wide canvas belt. Both machines motorised A.C. 400/440/3/50.—Apply Box B5385.

TWO Southall and Smith Automatic Flour Weighers to weigh 1 to 3 lb. of flour at 10/12 weighings per minute, each complete with hopper and stand. In good condition.—Frank Stacey and Co. Ltd., Vauxhall Street, Birmingham, 4.

FONDANT Beater, belt drive and steam jacketed, Tipping Pan by B.P.—Fortts, Manvers Street, Bath.

CONTINUOUS
QUICK FREEZING S.B. TUNNEL

capable of deep freezing 1,000 lbs. per hour continuously; swing tray type; size 15′×12′×10′.

Other Refrigeration Plant from:

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JAM Factory on Merseyside for disposal. Small limited Company with available tax losses over £5,000. Old established business suitable for a multiple desiring to manufacture or for development as a trading concern. Freehold Premises if required could be leased or purchased.—Apply Box K423, Lee and Nightingale, Liverpool.

MISCELLANEOUS SALES

APPROXIMATELY 2 tons Blackcurrant Jelly, 80% soluble solids, packed in 28-lb. tins. In first-class condition. Best offer to clear.—Box B5390.

LIQUORICE Paste, bulk supplies available. Ready for extruding or forming. 1s. 0d. per lb. —box B5376.

BLACKCURRANT Juice for sale, c.i.f. London.—Box B5377.

SALE: Nine 10-gal. Casks, H.P.G. pea colouring (Stevenson and Howell), suitable fresh or processed peas.—Offers to Willharts Ltd., 27, The Headrow, Leeds, 1.

FACTORY Premises for sale, Glasgow area. Buildings cover approximately 12,250 square feet on ground floor, and 9,580 feet on upper floor. Extent of ground about 34,290 square feet. Buildings contain modern refrigerating plant and cold storage rooms, offices, etc. Ample yard space. Suitable for many types of food manufacture and storage.—For full particulars apply to J. W. Jarvie and Co., C. A., 24, St. Vincent Place, Glasgow, C.1.

BLACKCURRANT Pulp. Organisation with own growers under contract offers supplies to users on long term contract.—Box B5386.

TRAYS

Heavily galvanised perforated mild steel stacking trays; 25" × 6½" × 11½"; price 4/- each; special price for quantities; ideal for food and fish industries; send P.O. for sample.

ALFRED'S ICES (1954) Ltd.
3,5 Hall Place, London, W.2.
Telephone: PADdington 6619

SECTIONAL Buildings, timber, timber and asbestos, 10 in. to 24 in. spans. A few second-hand buildings available. Enquiries invited for Site Huts, Temporary Offices, Club Rooms, Church Halls etc. Free Catalogue.—Universal Supplies (Belvedere) Ltd., Crabtree Manorway Belvedere, Kent. (Erith 2948.)

250,000 brand new, still in manufacturer's cartons, 1 lb. and 2 lb. Aluminium Pudding Basins, lacquered inside. No reasonable offer refused.—Box B5334.

80,000 2 lb. Circular Tins complete with tops lacquered inside, brand new, still packed in manufacturer's cartons. No reasonable offer refused.—B5335.

ALL Your Polythene Bag Requirements, all sizes and sack liners, lowest prices, actual manufacturers.—Polyplak Containers Ltd., 54, Warwick Square, S.W.1. Tel.: VIC 5682.

80,000 brand new 2-lb. capacity Lacquer-lined Tins, complete with tops. These are still packed in manufacturer's cartons. Exceptionally cheap for quick disposal.—Box B5319.

SODIUM Alginate, Lecithin, stocks held by direct importers.—L. E. Pritchitt and Co. Ltd., Hatch End, Middx. Tel.: Hatch End 2334.

"FRIGIDAIRE" Low Temperature Refrigerators. 49 in. wide by 28 in. deep by 34 in. high. Ex large National User, suitable for A.C. or D.C. deep freezing, storage of ice cream, frozen foods, etc. Price £30 each. Domestic Refrigerators, Service Cabinets, and Cold Rooms also available.—A.R.C., 130, Great Portland Street, London, W.1. MUSeum 4480.

The Strongest Vanilla Flavour
VANOLEUM
1 oz.(2/6) makes a pint of essence
4 ozs. 8/6. ½ lb. 16/6 1 lb. 32/-
For further details apply:
ARTHUR WHITTAKER & CO. LTD.
30 Church St., Newton Heath, Manchester, 10

SECOND-HAND PLANT FOR SALE

FULLY automatic Packing Machine by "SIG" Switzerland, type OCDS, for cartons 168 by 89 by 32 mm., speed 100 per minute.—Box B5372.

ONE B.C.H. automatic Dicing Machine and one Kellies Quartering, Peeling, etc., Machine. Reconditioned, little used, for disposal.—Box B5374.

Phone 98 Staines

STAINLESS Steel Plant. S.S. Gardner Mixer/Sifter, 40 in. by 17 in. by 17 in. S.S. jac Mixers, 39 in. by 32 in. and 40 in. by 24 in. S.S. jac. Pan, 100 gal., 60 w.p. S.S. Pans, 200 gal., two 150 gal. and two 70 gal. S.S. and chrome Emulsifiers Mixing/Arms. S.S. Autoclaves, 6 ft. by 3 ft., 100 w.p. (three). S.S. gas-heated Pan, 23 in. by 19 in. Two 36 in. by 30 in. Cooling Rolls or Dryers. Glass-lined cyl. Tanks, 5,000, 2,000, 850 and 625 gal. Unused portable elec. Stirring Arms, ½ h.p., 400/3/50. Thirty "Z" and fin blade Mixers, up to 29 in. by 27 in by 27 in. deep. 150 copper, steel and cast iron jac. Pans, up to 875 gal. Retorts, Conches, Refiners, Crushers, Disintegrators, Extruders, Edge Runners, Filter Presses, Pumps, Hydros, Ovens, Autoclaves, Steam and Diesel Plant, etc.—Harry H. Gardam and Co. Ltd., Staines.

PREMIER Filterpress, ES4. Vacuum Seamer in good condition. Vacuum Pump and reservoir. Crawford automatic Can Labeller. Albro vacuum Chutney Filler. Morris ½-ton D.C. Chain Block. No reasonable offer refused. —Box B5379.

VARIOUS selection copper c.i. steam-jacketed Boiling Pans for sale, Tilt and Non-tilt, with or without Stirrers. Suitable for Food Processing.—Box B5359.

Reconditioned Labellers

as new . . .

Purdy Automatic and Semi-automatic.
Bratby & Hinchliffe Automatic.
Flowers Semi-automatic.
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Can Labellers.
Labellers always in stock

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SECOND-HAND PLANT WANTED

WANTED, Melanguer, about 5 ft. diam., turning bedplate, deep sides. Only a mechanically sound machine, with or without motor, is of interest.—Please send details stating price to Nectar Ltd., 26, Islington Park Street, London, N.1.

ROLLER Drier by Simon, Bertram, or similar. —Box B5371.

CENTRIFUGAL Oil Purifier preferably manufactured by Alfa-Laval.—Full particulars and price to Box B5380.

CONTINUOUS Freezing Plant wanted, either Creamery Package or Cherry Burrell.—Particulars to Box B5387.

CREAMERY Package or Cherry Burrell Pasteurising and Homogenising Plant required. —Box B5388.

REQUIRED one four-head apple slicer and seeder, Mather & Platt or other make.—Box B5392.

SECOND-HAND PLANT FOR SALE

600

VERTICAL four-roll Refining Mill, by Buhler steel-cored rolls 29½ in. long by 12 in. diam., driven through helical gears by fast pulley. Hand-wheel adjustment at front, with pressure gauges and scraper knife. Built-in feed hopper at top with fluted feed roll, knife and eccentric lever for engaging. Top roll fluted others plain.

Melangeur, by J. M. Lehmann, 6 ft. diam., cast steel bed and sides 12 in. deep with side outlet. Twin granite rolls 27 in. diam. by 13 in. face under-driven through crown wheel and pinion. Underneath of pan fitted two-turn 2-in. diam. pancake steam coil. Ploughs and scrapers, and mounted on cross-head with hand-wheel adjustment. Pan enclosed in plywood cover with slide door for inspection. Mounted on single bedplate.

Complete Vacuum Drying Plant, by Scott, comprising horiz. band drier, approx. 35 ft. long by 6 ft., with service feed hoppers, shaker feeder, condensate receivers for hot-plates, vacuum augmentor, Kek mill, screening and finished material hoppers, tailings elevator, wet and dry vacuum pumps. Fully motorised.

Complete Drying Plant, by Dunford and Elliott, comprising rotary louvre drier approx. 18 ft. long by 4 ft. diam., geared motor drive, complete with Keith Blackman steam heater, attendant motor-driven fan, steam traps, motor-driven exhaust fan, cyclone, etc.

Patent Tubular Drier, by Simon, model OB, approx. 11 ft. 6 in. long by 32 in. by 32 in., ¾ in. c.i. bolted constr. Fitted revolving nest of steam tubes for 100 lb./sq. in. w.p. Drier fitted feed hopper and worm conveyor, exhaust fan, motor, etc.

Single-roll spray Film Drier, by Kestner, 10 ft. long by 42 in. diam., constr. close grain c.i., 1¼ in. drum carried on steel trunnions in roller bearings. Supported on cast iron framework and fitted tinned steel hood and enclosure for pipework, etc. Complete with stainless steel knives, Alley and MacLellan air compressor set, filter-type receiver, extraction fan, electric motor, etc.

Vertical Cake Mixer, by Crypto, 40 qt. capacity, three-speed, with dough hook, whisk, beater and mincing attachments. Motorised 230/250/1/50. M.S. bowl 16 in. diam. by 14½ in. deep, hand-wheel operated rise and fall gear.

80-gal. stainless steel steam jacketed Boiling Pan, by Groen Mrg., U.S.A., 32 in. diam. by 29 in. deep, hemispherical bottom, jacketed in this portion only. Bottom run-off fitted plug cock and hinged lid. Jacket suitable 40 lb./sq. in. w.p., fitted release valve and cock.

Unused jacketed copper hemispherical Boiling Pan, by Brierley, Collier and Hartley, 21 in. diam. by 15 in. deep, contra-rotating bronze scraper-type agitators driven by f. and l. pulleys. Screwed steam connections and glanded trunnion bearings. Hand-wheel tilting. Mounted on cast iron frame. Pouring spout. Jacket suitable for 30 lb./sq. in. w.p.

Walmar Mark V Chocolate Enrober, by Walter Denis-Contacts. Water jacketed chocolate bath fitted immersion heater and thermostat, 6 in. wide chain-type conveyor in coating section, air operated rippler, cooling section approx. 56 in. long mounted over 6-ft. centres, flat belt conveyor fitted 6-in. wide canvas belt covered food grade rubber. Cooling supplied by self-contained refrigeration unit, complete with A.C. motors.

New stainless steel Storage Vessels and Tanks, with capacities ranging from 8 gal. to 1,000 gal.

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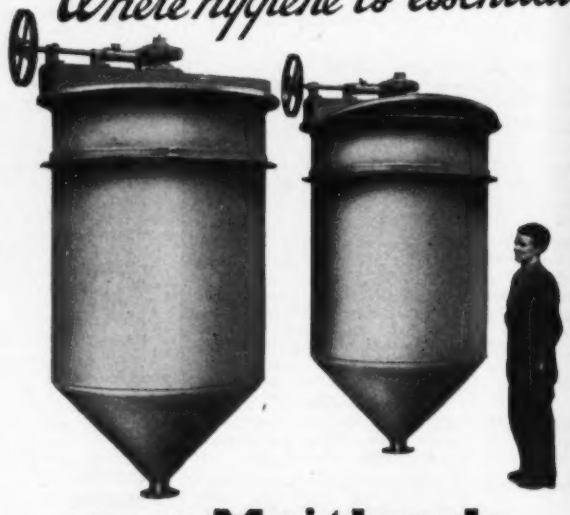

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The illustration shows Mixing Vessels used in the preparation of Baby Foods.

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As specialists in transparent packaging materials and makers of the famous "Cellophane" cellulose film, British Cellophane Limited, through world-wide connections, keep their finger on the pulse of packaging: on merchandising trends and techniques, on wrapping methods and machinery. The fruits of this unrivalled fund of knowledge are passed on to manufacturers and retailers in down-to-earth aid and advice, in new and improved films.

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The Versatile "GRANGEMOUTH" washes BOTTLES of all types, JARS & VIALS, etc.

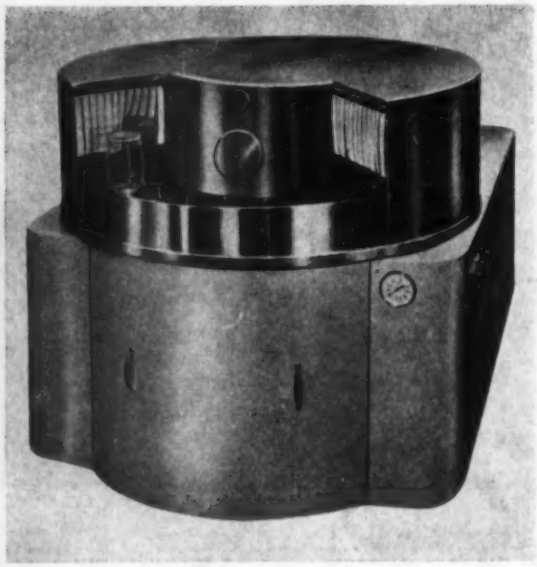

FIG. 452. A 60 Bottle size "Grangemouth" machine specially designed for more extended treatment, enlarged at the back to include two feed tank and pump units.

MADE IN THREE SIZES . . .

1. **Output up to 1,500 bottles per hour**
2. **Output up to 3,000 bottles per hour**
3. **Output up to 6,000 bottles per hour**

FOR FOOD OR BEVERAGE CONTAINERS

The well-proved principle of the "Grangemouth" machine is common to all sizes and we have a model to suit all output requirements and washing sequences. Wherever a small simple machine is needed the "Grangemouth" Rinser is extremely popular.

The "Grangemouth" Power Rotary Rinsers are primarily intended for cleaning new bottles, vials and similar containers, and are made in 3 sizes—the 24-Bottle size; the 60-Bottle size and the Multi-jet size, with outputs of 1,500, 3,000 and 6,000 bottles, jars or vials per hour.

Although "Grangemouth" machines are of standard construction, we are always pleased to alter the machine in order to accommodate the range of bottles or provide special rinsing treatment, specified by a customer, for the "Grangemouth" is a most versatile machine. They have a wide appeal to Food, Soft Drinks and Chemical Manufacturers, Brewers, and Wine and Spirit Trades, who find them wholly reliable.

The "Grangemouth" is made in two finishes—the standard for general use and a special finish which employs a good proportion of stainless steel and chromium plated parts, in order that a high degree of cleanliness and sterility can be obtained.

THE "GRANGEMOUTH" HYDRO

The latest addition to the "Grangemouth" range of machines is the "Grangemouth" Hydro, which is intended to meet the needs of those whose bottles require more vigorous treatment and, in particular, to provide for complete label removal and disposal.

The basic design follows the well-tried rotary principle, but in the development of this principle many features have been incorporated showing considerable advance on previous and contemporary designs. Another feature of this machine is the small amount of floor space required.

Illustrated literature on "Grangemouth" machines will be gladly sent on request.

Makers of "CORRECT" PROCESS BOTTLE CLEANING MACHINES

The THOMAS HILL ENGINEERING CO. (HULL) LTD.

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